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### THE VALUE OF ENDORHINOSCOPIC EXAMINATION.

BY MACLEOD YEARSLEY, F.R.C.S.

To the average general practitioner there is one method of examining the nasal cavities, and one way only—that known as "anterior rhinoscopy"—practised more or less imperfectly by means of various specula, most of them badly adapted to the nose to be inspected. A few, more advanced, realise that a something further can be learned if the examination is also conducted under the influence of cocaine. Most know of the use of the posterior rhinoscopic mirror, but very few practise it with any ease or advantage.

Even the majority of rhinologists are somewhat restricted in method; anterior and posterior rhinoscopy, digital examination, transillumination, skiagraphy appear to form the extent of their means of obtaining knowledge. Conversation with them leads to the conclusion that, with one or two exceptions, they never go beyond these time-honoured methods, and pay no heed whatever to the possibilities of endorhinoscopy. The one or two exceptions are, however, quietly practising endorhinoscopic examination.

Taking up certain well-known text-books at random, one finds the following:

Tilley ("Diseases of the Nose and Throat," edition 1908) describes anterior and posterior rhinoscopy, but makes no mention of any other method.

Thomson ("Diseases of the Nose and Throat," second edition, 1916) describes anterior and posterior rhinoscopy; median and deep rhinoscopy by means of Killian's long nasal speculum; Yankauer's nasopharyngoscope, and, doubtfully, dismisses Hay's pharyngoscope.

Ballenger ("Diseases of the Nose, Throat and Ear," fourth edition, 1914) appears to consider any description of nasal examination methods as beneath notice.

The late Major Porter, in his excellent manual ("Diseases of the Throat, Nose and Ear," second edition, 1916) gives the best description of all. He mentions Hay's and Holmes's instruments for examining the nasopharynx (that no nasal examination is complete without a careful investigation of the post-nasal space goes without saying), but makes no allusion to the use of the latter in the nasal chambers themselves.

As a matter of fact, not one of these four books appears even to consider the possibilities or advantages of endorhinology.

Let us review for a space the usual methods employed for rhinoscopic examination.

*Anterior Rhinoscopy.*—This, practised with whatever speculum—Frankel, Lennox-Browne, and Thudichum—is most easy of manipulation to the observer, is the most universal. It is doubtful whether the majority of general practitioners ever uses any other. Properly carried out, which means the movement of the speculum in various directions, and combined with the use of a wool-armed probe, it tells us a great deal. With the added advantage of a weak cocaine solution, it tells us more, and no anterior rhinoscopy should be deemed complete without it.

*Posterior Rhinoscopy* is often difficult, sometimes impossible. Carried out with the aid of a palate hook, it is not pleasant for the patient. It requires considerable skill and practice, and in the hands of a really expert manipulator, yields most useful information. But even the most expert posterior rhinoscopist may be defeated. Further, when using the posterior rhinoscopic mirror, it is very rarely possible indeed to do anything else in the way of applications, etc.

*Digital Examination.*—Digital examination, as one of the roughest and most unpleasant methods of exploration of the post-nasal space and choanæ, is well known. It need not be dilated upon here. It teaches us something. Also the surgeon, who has a delicate fourth finger, can occasionally obtain quite useful information by introducing it into the nasal cavities *via* the anterior nares. But it requires an anæsthetic.

*Transillumination*, another well-known method of investigation, is usually a mere adjunct, giving no additional evidence as to conditions, partly or wholly diagnosed by other means. But I wonder how many rhinologists have ever realised the advantage of anterior rhinoscopy whilst the patient has the transillumination lamp in the mouth. The illumination of the nasal cavities by the light coming through the posterior nares and through the translucent palate often very greatly aids the use of the anterior speculum.

But none of these methods gives any opportunity of seeing into the various nooks and crannies of the nose. By these careful exercises one learns much, but much also remains unseen. It is for the otherwise unseen that endorhinology is so valuable.

Some attempt at endorhinology is aimed at by Killian's long nasal speculum. I tried this method years ago, but gave it up as unsatisfactory. Even under cocaine it was uncomfortable, painful, and did not find the information obtained by its use commensurate with the attendant discomfort. I have occasionally used it since then when the patient has been under a general anæsthetic. Even then, however, it gives but a small and sometimes distorted view.

For adequate endorhinology, therefore, one must find some other instrument. Now, for examination of the nasopharynx there are two—those of Hayes and Holmes. The former is introduced through the



mouth, under the soft palate; I have never used it, and do not know whether it could be utilised in the nose. The latter is passed, like a Eustachian catheter, through the nose into the post-nasal space. It is this instrument that I have employed during the past six years. I showed it at the Otological Section of the Royal Society of Medicine in 1912 (*Proceedings*, vol. v, pt. iii, Otol., p. 11), but it excited little interest and the Fellows appeared to regard it as a useless toy.

For about three years I used Holmes's electric nasopharyngoscope solely for exploring the post-nasal space and found it invaluable for diagnosis. It seemed to open up a new aspect of the relation of the nasopharynx to ear disease. Then it occurred to me that an instrument which gave me such good results in one region might prove equally useful in an extended sphere and I began to use it for the nasal cavities themselves. In this paper I propose to give a general account of the results obtained.

When using the instrument, it is preferable to cocaineise the nose lightly, the application of a 5 per cent. solution with a cotton swab to the lower part of the nasal septum being quite sufficient. The tube is then passed through the nose into the nasopharynx like a Eustachian catheter. The light switched on, the eye is applied to the large lens-carrying end. As the instrument can be turned in its collar, every part of the nasopharynx can be examined. The tube can then be slowly withdrawn through the nose and each part explored. If necessary, the instrument can be introduced at an angle with the floor.

*Examination of the Nasopharynx.*—Before discussing what the nasopharyngoscope reveals when used in the nasal cavities, a few words may be devoted to its use in the post-nasal space. By slowly turning the tube until it has performed a complete circle, a very comprehensive view of the roof, choanæ, Eustachian tubes, and other features of the space can be obtained. Indeed, the use of the instrument, in showing differences in the Eustachian tubes, etc., greatly widens one's ideas as to the nasopharyngeal conditions associated with middle-ear deafness. To illustrate this, I have made sketches of some of the conditions which I have actually observed. Fig. 1 shows the appearance of the normal Eustachian tube, drawn from a young woman, aged twenty-five, whose nose, ears and hearing were normal. Unfortunately, pen-and-ink sketches give no idea of the colour, which is a fairly uniform pink. The lumen, lips, and floor of the tube can be distinctly seen, and Rosenmüller's fossa is indicated by the shadow behind the Eustachian cushion. If the patient be told to swallow or phonate, the movements of the tube can be seen distinctly, and on several occasions I have noted a rhythmic movement of the ostium with deep breathing.

In cases of middle-ear deafness, the appearances of the Eustachian tube and nasopharynx vary considerably. Fig. 2 is a sketch done quite recently of a moderate adenoid mass in a boy, aged twelve. He was reported to have had adenoids removed by a general surgeon a year before, but deafness having increased, he was brought to me for a further opinion. His general practitioner did not believe he had any adenoids, but the mass shown in Fig. 2 was removed with excellent results. I might point out here that, as a general rule, the picture given of adenoids both by the nasopharyngoscope and by the posterior rhinoscopic mirror is always misleading as to the size of the mass; removal proving it to be larger than it looked.

The picture shown in Fig. 3 is an interesting one. A girl, aged ten.



FIG. 1.



FIG. 2.



FIG. 3.

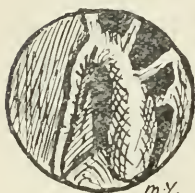


FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



FIG. 8.



FIG. 9.



FIG. 10.



FIG. 11.



FIG. 12.



FIG. 13.

FIG. 1. Normal right Eustachian tube opening; female, aged twenty-five.—FIG. 2. Adenoids; female, aged twelve.—FIG. 3. Unremoved adenoids in left Rosenmüller's fossa, pressing on Eustachian cushion; male, aged ten.—FIG. 4. Adhesions in right fossa of Rosenmüller interfering with proper movements of



had adenoids removed by a general surgeon six months previously. When I saw her she had an acute left suppuration. The nasopharyngoscope showed a mass of adenoids crowding Rosenmüller's fossa. This was intensely congested, so that it looked like a collection of minute strawberries. There was a similar, smaller adenoid mass in the lateral recess on the opposite side, but it was the left mass that seemed to have got the full strength of the infection. Evidently, in this case, the surgeon had been content to remove a large central mass of growth and had neglected to clear the lateral recesses of the nasopharynx: an omission which, as I have pointed out elsewhere, is not uncommon when the adenoid operation is done by surgeons other than specialists. It is, moreover, a serious omission from the otological point of view and contributes considerably to the discredit which is attached by some to the removal of adenoids.

The later effects of the non-removal of adenoids or of the neglect to clear thoroughly the fossæ of Rosenmüller is well shown in Fig. 4, from a man, aged thirty-two. I have found that adhesions in Rosenmüller's fossæ, such as are seen here, a fairly common condition in catarrhal middle-ear deafness in young adults. With it goes a history which points to neglected adenoids in childhood, often accompanied by recurrent attacks of earache. These adhesions are probably the traces left by adenoids which have retrogressed and that they seriously hamper the normal movements of the Eustachian tube can be seen through the nasopharyngoscope. Under favourable circumstances, the removal of these adhesions results in improvement in the hearing.

The case depicted in Fig. 5 reveals the action of enlarged posterior ends of inferior turbinates upon the Eustachian tube. This picture was taken from a woman, aged thirty-three, who had middle-ear deafness on the left side, with a septum badly deflected to the right. A large posterior end of the left inferior turbinate was seen in the foreground, with the Eustachian cushion swollen, somewhat darker in colour than the one on the opposite side, and granular. This appearance is probably due to the continued irritation of the secretions poured out by the glands of the posterior end of the turbinate, which share in its hypertrophy.

In acute and subacute middle-ear deafness arising during an acute

Eustachian tube; female, aged thirty-two.—FIG. 5. Large hypertrophy of posterior end of left inferior turbinate; the Eustachian cushion is swollen and of granular appearance; female, aged thirty-three.—FIG. 6. Left Eustachian cushion swollen and congested; mucus flowing from the lumen; male, aged thirty-one.—FIG. 7. View of posterior nares; a large posterior spur blocks the left, a small part of a posterior end hypertrophy peeping over it. On the right is a large posterior end hypertrophy, with a slightly similar condition of the middle turbinate; female, aged fifty-two.—FIG. 8. Large post-nasal polypus nearly filling space; female, aged twenty-five.—FIG. 9. View of right nasal cavity from about the middle; the tube of the instrument lay on the nasal floor, the lamp and prism upwards. To the right of the picture is seen from below an inferior septal spur; to the left the smooth inferior turbinate, with the middle turbinate showing above it; male, aged sixty-two.—FIG. 10. View of right nasal cavity, showing three small polypi growing from under the edge of the middle turbinal, about its centre; male, aged forty-five.—FIG. 11. View of anterior part of right nasal cavity, showing a small polypus at the entrance of the frontal sinus; the polypus showed very white compared to the pinkish colour of the nasal mucosa; female, aged seventeen.—FIG. 12. Mucopus escaping from the right maxillary sinus, beneath the middle turbinal; female, aged thirty. FIG. 13.—Drop of pus issuing from right sphenoidal opening; male, aged forty-three.

nasal catarrh, swelling and congestion of the Eustachian cushion may often be seen, sometimes symmetrical, sometimes unilateral; in the latter case, one cushion may be swollen to nearly double the size of the other. Fig. 6 is an interesting picture, because it depicts the condition seen in a case of acute catarrh with fluid in the tympanum. The patient, a man, aged thirty-one, showed the dark, curved line across the tympanic membrane indicative of this condition, uncommon in England. With intent to endeavour to relieve him without incising the membrane, I used the Eustachian catheter and, following its passage, inspected the nasopharyngoscope with Holmes's instrument. The Eustachian cushion was twice the size of its fellow, and issuing from the lumen was a drop of moderately viscid mucus, which I was able to wipe away with a cotton carrier passed through the opposite nostril. A myringotomy was not required.

Not the least use of the nasopharyngoscope is that by its means applications can be made directly to the Eustachian tube and other parts of the nasopharynx, or, in difficult cases of catheterisation, one can direct the beak of the catheter by vision.

Before leaving these brief references to the Eustachian tube, I would point out that, in some cases accompanied by flaccidity of the tympanic membrane, an undue patency of the ostium of the tube may be noted.

Fig. 7 shows a view of the posterior nares drawn from a sketch made with the Holmes's nasopharyngoscope in position. Of course such a picture has to be made whilst the instrument is turned in different directions. Pictures obtained with the posterior rhinoscopic mirror are very made up in character, but those afforded by the Holmes's instrument are much more continuous; they are made more on the panoramic principle, if one may so term it, than by piecing together glimpses of a more or less passing nature. The picture in Fig. 7 was made from a lady, aged fifty-two, who suffered from chronic nasal and post-nasal catarrh, with nasal discharge and continual "dropping of mucus" behind the soft palate. She was the subject of dyspepsia and was always catching cold. This case especially shows the value of the nasopharyngoscope, for anterior rhinoscopy showed very little beyond small inferior ledges to the septum and swollen middle turbinals. Under cocaine, a doubtful bulging of the septum at the back of the left nasal cavity was suggested rather than seen. Posterior rhinoscopy was unsatisfactory. With the nasopharyngoscope, the doubtful septal appearance resolved itself into a marked bony spur blocking the left choana, a fragment of hypertrophied posterior end peeping over its upper edge. The right choana was blocked by a large hypertrophy of the posterior end of the inferior turbinal. By no other means (save, perhaps, imperfectly by digital examination) could the real condition of the nose have been made out.

The picture shown in Fig. 8 is that of a large post-nasal polypus, nearly filling the nasopharynx, in a woman, aged twenty-five.

*Examination of the Nasal Cavity.*—By slowly withdrawing the instrument along the floor of the nose and turning the beak in different directions, very good pictures may be obtained of the interior of the nose. The advantage of this method is that different parts of the cavity can be brought directly under the eye. I have selected a few sketches which may give some idea of the pictures thus obtained.

Although I fear that pen and ink furnishes but inadequate means of conveying to a reader the majority of the views afforded by the naso-

pharyngoscope. Colour pictures are better, but even these fail as representations of the actual thing, and nothing but practice in endorhinology can bring a true appreciation of its value, especially in the diagnosis of doubtful cases. As an instance, I would cite the following:

A lady, aged twenty-nine, was twice operated upon for empyema of the right maxillary antrum in January, 1915, and May, 1916, the cavity being reported as full of polypi on both occasions. In December, 1916, she had pneumonia. Recently she had suffered with indefinite symptoms referred to the nose, and probably of vasomotor origin. A further operation (? removal of upper jaw) had been suggested, and my opinion was sought in confirmation. Examination was negative. The nasopharyngoscope was used, and, as a liberal opening had been made into the antrum under the inferior turbinal, the instrument was introduced into the antrum through the hole. The cavity was quite empty, save for a little mucus, and no single granulation could be detected.

On an earlier occasion I was able similarly to explore an antrum that I had myself operated upon, and in that case the Holmes's instrument showed me a small polyp in the anterior inferior angle.

Fig. 9 gives some idea of the picture obtained in a man, aged sixty-two, by endorhinology with the instrument upon the nasal floor, and the lamp and prism directly upwards. The right cavity is under examination. On the right of the picture is seen a large crested inferior septal deviation, under which the instrument is partly lying. On the left the edge of the inferior turbinate appears, that of the middle turbinate showing above it. The higher regions are in shadow, but, in many cases, a gentle depression of the proximal end of the instrument will raise the distal lamp sufficiently to illuminate the upper part of the cavity.

In Fig. 10 a view is shown from about the same spot: also in the right nasal chamber. In this case, however (a man, aged forty-five), the septum is straight. Below the junction of the anterior and middle thirds of the middle turbinate can be seen three small polypi. These polypi were not visible by anterior rhinoscopy.

Fig. 11 shows the anterior part of the right nasal cavity of a girl, aged seventeen, and, as in Fig. 10, plainly indicates what could not be seen by anterior rhinoscopy, viz. the passage leading to the frontal sinus, with a small polypus growing therefrom. This is especially a picture which loses by not being in colour, as the polypus showed very white against the pinkish colour of the mucous membrane.

The same may be said of Fig. 12, which shows the right nasal cavity, about the middle, in a woman, aged thirty. Mucopus is seen escaping from the right maxillary antrum. It flows over the inferior turbinate from under the swollen, irregular edge of the middle turbinate.

Holmes, in his first description of his electric nasopharyngoscope (*Annals of Otology, etc.*, xx, 29), mentions that "in several cases we have seen pus dropping through" the opening into the sphenoidal sinus. I have been able to note this condition on one occasion only, shown in Fig. 13, in the case of a man, aged forty-three. The sphenoidal opening is not by any means easy to make out.

I trust that these brief notes may be sufficient to stimulate others to make trial of endorhinology. Possibly some of our younger rhinologists will take up the subject and make valuable additions to its practice. I know of one of the older generation who realises its value.

Personally, I am of opinion that endorhinoscopy has potentialities worth developing, and that it will become as much a routine examination among specialists as inspection with an ordinary speculum through the anterior nares.

## PRIMARY TUBERCULOSIS OF THE FAUCIAL TONSILS IN CHILDREN.<sup>1</sup>

By A. PHILIP MITCHELL, Ch.M., M.D., F.R.C.S.,

Interim Surgeon, Royal Hospital for Sick Children, Edinburgh.

(*Report to the National Medical Research Committee.*)

*From the Royal College of Physicians' Laboratory, Edinburgh.*<sup>2</sup>

THE primary localisations of tuberculosis is still a much vexed question, especially in regard to the relative frequency in which infection takes place through the alimentary and respiratory tracts, and also in what way the primary focus becomes the source of subsequent secondary and more generalised infection. The object of this research was not to consider so extensive and important a subject in its entirety, but to ascertain the frequency of primary tuberculosis of the faucial tonsils and its connection with other tuberculous affections, more particularly with the frequent involvement of the cervical lymph nodes.

Whilst much has been written upon secondary tuberculosis of the tonsils, where phthisical patients have infected their tonsils by their own sputum, the primary form of the disease has hitherto received little attention. Many of the best known text-books in surgery and diseases of the throat and nose either do not refer to tuberculosis of the tonsils at all or treat it as of rare occurrence. The opinion most generally held by clinicians is that the primary form of the disease is of rare occurrence. The reason is probably not far to seek, in that the tuberculous tonsil seldom causes symptoms apart from secondary infection of the cervical glands. Pathological results have also differed greatly in the number of instances in which tuberculous lesions in the tonsils have been found. This variance is due partly to the fact that some give *post-mortem* reports, whereas others detail the results of the examination of tonsils removed during life. The conclusions drawn from such observations must necessarily be one-sided. It appears, therefore, that there is need of additional statistics relating to the subject.

The present investigation formed part of my study of tuberculosis of the cervical lymph nodes reported on in the *British Medical Journal*, London, 1914, vol. i, p. 125, and essentially is concerned with material derived from surgical operations. During the period 1910-16 the material was obtained in the routine of hospital practice. I am particularly indebted to Mr. Harold J. Stiles and Mr. C. Balfour Paul, late Assistant-Surgeon to the Royal Hospital for Sick Children, Edinburgh, and also to Drs. Logan Turner and J. S. Fraser, of the Royal

<sup>1</sup> [Received October 18, 1916.] The expenses of the research were defrayed by grants from the Carnegie Trust and the National Medical Research Committee, for which I desire to express my thanks.

<sup>2</sup> From the *Journal of Pathology and Bacteriology*, vol. xxi.



Infirmity, Edinburgh, for the valuable specimens they have so kindly placed at my disposal.

The inquiry falls naturally into two divisions—the examination of:

- (1) Tonsils removed from children affected by tuberculosis of the upper deep cervical glands (Group A).
- (2) Hypertrophied tonsils removed from children with no clinical evidence of tuberculosis of the cervical lymph nodes or other parts (Group B).

In connection with such investigations the following points cannot be too strongly emphasised: (1) The age of the patients; (2) the source of the material, *i.e.* whether it has been obtained during life or from *post-mortem* examinations; (3) the clinical evidence of tuberculosis; (4) the history of tuberculosis in other members of the household.

#### METHODS EMPLOYED.

The tonsils on removal were at once thoroughly rinsed in running water and then in several changes of distilled water. Finally they were placed in a sterile Petri dish and each tonsil bisected with sterilised scissors and forceps. The cut surfaces were carefully examined for naked-eye evidence of tuberculosis. Any indurated areas detected by palpation with forceps were reserved for subcutaneous inoculation into guinea-pigs. Otherwise the central portion of each tonsil was selected. The remainder of each tonsil was placed in 5 per cent. formalin and later in alcohol for the preparation of sections. Serial sections were cut, and the staining methods employed were: (1) Eosin and hæmatoxylin, (2) Ziehl-Neelsen, (3) Much's modified Gram's stain.

The obvious difficulty in employing animal inoculations is the presence of contamination organisms in the tonsils. To find some agent which would kill the majority of such bacteria that may be lurking in the crypts or elsewhere, but which would leave intact the tubercle bacillus, was a problem not easily solved. Of the various agents tried the most satisfactory proved to be a 2 per cent. aqueous solution of ericolin as employed by Twort (1910<sup>14</sup>) for killing the contamination organisms in nasal scrapings from leprosy cases.

The selected portions of tonsillar tissue, after thorough washing in distilled water, were dropped into a sterile test tube half full of ericolin. This was placed in the incubator at 30° C. for two hours. The tonsillar tissue was again washed in distilled water and was then ready for inoculation into one or more guinea-pigs. All inoculations were made into guinea-pigs of about 400 grm. weight, and the tissue was injected as soon as possible after removal from the patient. With aseptic precautions several "ericolised" pieces of each tonsil were placed under the skin of the right flank and the wound sutured, or they were introduced by means of a special trocar and cannula.

In positive cases swelling and caseation of the glands in the right groin regularly appeared; afterwards the retroperitoneal lymph glands, the spleen and liver were attacked, and finally the bronchial and cervical glands and the lungs. As a rule the animals were killed in four to six weeks. It was found that the spleen and softened caseous lumbar glands were the structures that yielded the best growing cultures.

Cultivation of the bacilli was at first attended with difficulties. The

number of contaminated tubes was an outstanding feature. This was to be expected in view of the difficulty of sterilising the tonsillar tissue, and the findings supported the view that inoculation experiments with tonsils have not the same value as when performed with other tissues. The histological examination of the entire tonsil is in my mind a thoroughly reliable diagnostic method. But animal inoculations were also employed to meet the criticism of those who maintain that foreign substances in the tonsils are frequently a cause of lesions identical with those produced by the tubercle bacillus, and, moreover, to determine the relative frequency of the bovine and human types of tubercle bacilli in tuberculous tonsils.

As advised by Dorset (1902<sup>12</sup>), Park and Krumwiede (1910<sup>32</sup>), egg media (plain egg and glycerin egg) were employed in all cases for raising primary cultures. To these media I found it extremely advantageous to add a few drops of alcoholic basic fuchsin to give a distinct pink colour, as advocated by Cruickshank (1912<sup>10</sup>). The use of coloured media is of great help in aiding the detection of early colonies or in recognising a scanty primary growth. These media—along with glycerin serum, glycerin agar, and glycerin potato—were used in classifying the cultures. No difficulty was experienced in differentiating the cultures into bovine and human types, that is, no intermediate types were present in my series.

The cultural characters, along with the virulence test in rabbits, supplied in each case the necessary data for the differentiation of type. In order to obtain a clear picture of the appearances produced in test animals by intravenous and subcutaneous injections of bovine and human cultures in varying doses, I carried out a series of preliminary experiments with known bovine and human cultures; the former I had isolated from cow's sputum and tissue from tuberculous udders, and the latter from human sputum. These preliminary experiments proved to be of great value, and seem to me worthy of special note now, as I did not mention the fact in my first paper already referred to. For testing the virulence of each virus two rabbits at least were injected, in order to preclude any possibility of doubt as to the accuracy of the primary results. The dosage employed was 0.1 mgrm. and 0.01 mgrm. of dried culture, injected intravenously, or infection with 5 to 10 mgrm. by the subcutaneous method was substituted for the larger of the intravenous doses.

#### RESULTS OF INVESTIGATIONS.

A critical review of the literature is difficult because of the variations in the technique of different workers and in the source of the material employed.

Koplik (1903<sup>24</sup>), as the result of much investigation, considers that while secondary tuberculosis of the tonsil is common, a primary affection is of rare occurrence. I hope to show that primary tuberculosis of the faucial tonsils is by no means so rare as is generally supposed, and the importance of recognising it as a primary focus cannot be too strongly insisted upon. The systematic histological examination of tonsils removed by operation from children during life does not appear to have received due attention, the consequence being that the tuberculous condition is overlooked at a time when its recognition is of the utmost importance to the patient.

More or less accidental cases have from time to time been recorded. Orth (1879<sup>30</sup>) seems to have been the first to have recorded a case of primary affection of the tonsil. He found tuberculosis of the tonsils in children who had died of diphtheria, the lungs being free from tuberculosis. Abraham and Kendal Franks (1885<sup>1</sup>), and Purves Stewart have published isolated cases. Piffel (1899<sup>33</sup>), in a review of all published cases, states that of 764 tonsils removed during life and in which tuberculosis was looked for, thirty, or 4 per cent., were affected.

TABLE I.—*Examination of Hypertrophied Tonsils for Tuberculosis.*

Name.	Number.	Tuberculosis.
Dieulafoy (1895 <sup>11</sup> ) . . . . .	61	18
Schreibner (1899 <sup>39</sup> ) . . . . .	11	0
Theissen (1900 <sup>42</sup> ) . . . . .	45	2
Bandelier (1906 <sup>3</sup> ) . . . . .	200	2
Friedmann (1900 <sup>13</sup> ) . . . . .	54	2
Macfayden and MacConkey (1903 <sup>28</sup> ) . . . . .	34	0
Lermoyez (1895 <sup>27</sup> ) . . . . .	32	2
Broca (1895 <sup>5</sup> ) . . . . .	100	0
Gottstein (1896 <sup>17</sup> ) . . . . .	33	4
Plüder and Fischer (1896 <sup>34</sup> ) . . . . .	32	5
Piffel (1899 <sup>33</sup> ) . . . . .	100	2
Rethi (1900 <sup>51</sup> ) . . . . .	100	6
Goure (1897 <sup>48</sup> ) . . . . .	200	0
Latham (1900 <sup>26</sup> ) . . . . .	45	7
Cornil (1912 <sup>3</sup> ) . . . . .	70	4
Kingsford (1904 <sup>23</sup> ) . . . . .	2	0
Wood (1905 <sup>45</sup> ) . . . . .	50	1
Robertson (1906 <sup>35</sup> ) . . . . .	232	19
Hodenpyl (1891 <sup>19</sup> ) . . . . .	200	1
Mathews (1910 <sup>13</sup> ) . . . . .	57	0
Wright (1896 <sup>46</sup> ) . . . . .	60	0
Sewall (1911 <sup>40</sup> ) . . . . .	772	30
Purves Stewart (1895 <sup>41</sup> ) . . . . .	1	1
Glas (1903 <sup>15</sup> ) . . . . .	2	2
Ruge (1896 <sup>56</sup> ) . . . . .	18	6
Judd (1910 <sup>22</sup> ) . . . . .	1000	23
Barnes (1914 <sup>4</sup> ) . . . . .	150	3
Hess (1908 <sup>18</sup> ) . . . . .	13	1
Albrecht (1916 <sup>2</sup> ) . . . . .	1060	3
Ghon (1916 <sup>14</sup> ) . . . . .	189	1
Abraham (1885 <sup>1</sup> ) . . . . .	1	1
Tusseau (1894 <sup>43</sup> ) . . . . .	3	3
Brindel (1895 <sup>6</sup> ) . . . . .	1	1
Ozeki (1899 <sup>31</sup> ) . . . . .	2	2
Johnston (1903 <sup>21</sup> ) . . . . .	1	1

For tonsils removed for hypertrophy and examined for tuberculosis Table I gives the figures arrived at by different investigators.

Dieulafoy and Latham obtained their positive results by inoculation experiments on guinea-pigs. They did not examine the tonsils microscopically before inoculation.

It is a noteworthy fact that only three of the investigators—namely, Kingsford, Latham, and Friedmann—have confined their attention to the tonsils of children.

In regard to the incidence of primary tuberculous infection of the

faucial tonsils in cases of tuberculosis of the cervical glands, I must again emphasise the fact that this subject has hitherto not received the attention it deserves. Table II gives observations on faucial tonsils, removed by operation from cases of tuberculous cervical adenitis.

It is obvious that no definite conclusions can be based on these statistics, on account of the small numbers of cases studied by the majority of the observers.

Coming now to my own investigations, the special points of these I wish to discuss are—

- (1) Clinical data.
- (2) Microscopical examination.
- (3) Experimental results—important relationship of sources of infection.
- (4) Pathological considerations—relation between channels of infection and groups of glands involved.

TABLE II.—*Primary Tuberculosis of the Faucial Tonsil in Tuberculous Cervical Glands.*

Name.	Cases.	Tonsils Tuberculous.	Operation.	Post-mortem Examination.
Carmichael (1910 <sup>8</sup> ) . . . .	50	7	Yes	—
Hurd and Wright (1909 <sup>20</sup> ) . .	12	9	..	—
Mathews (1910 <sup>29</sup> ) . . . .	8	5	..	—
Goodale (1906 <sup>16</sup> ) . . . .	7	7	..	—
Brown and Smith (1907 <sup>7</sup> ) . .	3	3	..	—
Friedmann (1900 <sup>13</sup> ) . . . .	2	2	..	—
Kruckmann (1894 <sup>25</sup> ) . . . .	2	2	—	Yes
Schlenker (1893 <sup>37</sup> ) . . . .	2	2	—	..
Barnes (1914 <sup>4</sup> ) . . . .	2	2	Yes	—
Ruge (1896 <sup>36</sup> ) . . . .	1	1	—	—

### *Clinical Data.*

First of all, the results of my inquiry regarding the presence of tuberculosis of the tonsils in cases of tuberculous cervical glands (Group A) will be given.

*Group A.*—The cases investigated number 106: one hundred children and six adults. Fifty-one cases were obtained from children under five years of age, forty-nine cases from children (aged five to fifteen), and six cases from adults (aged sixteen to thirty). The patients in most instances were not brought to the surgeon because of the throat affection, but for the glandular enlargement. All the children in both groups were born in Edinburgh and surrounding country districts. In Group A, cases from Edinburgh number sixty and those from country districts forty-six.

The tonsils were removed either prior or subsequent to the operation for excision of tuberculous cervical glands. In this connection it should be mentioned that the cases were selected in so far that the affected neck glands had been, or were to be, subjected, when possible, to a similar investigation. It may be stated that by mere inspection by the mouth a diagnosis of a tuberculous tonsil cannot be made. In



none of my cases was there any appearance in the tonsil to lead one to suspect the presence of tuberculosis, either on examination of the throat or on naked-eye inspection of the tonsil after removal. This coincides with the view of Pittl that, macroscopically, there is no means of differentiation between tuberculous and non-tuberculous tonsils, and few cases are recorded in which tubercle could be recognised by the naked eye. Hofmann (see Carmichael 1910<sup>5</sup>) describes a tuberculous ulcer of the tonsil, and Latham (1900<sup>26</sup>) also reports a case of ulceration of the tonsil associated with tuberculous glands in the neck.

The presence of a tuberculous tonsil can be suspected clinically only by its effects, namely, infection of the tonsillar lymphatic glands. This lesion undoubtedly constitutes the main importance of the tuberculous tonsil. Unfortunately, the tuberculous tonsil is often painless and rarely causes symptoms apart from glandular infection. But it does not by any means always pass unnoticed. Some children complain of "sore throat," upon which supervenes an enlargement of the neck glands which can be proved to be tuberculous. It is remarkable how seldom one finds secondary pyogenic infection of the tuberculous glands in such cases.

The size and shape of the tonsil do not seem to have any special relation to the tuberculous infection. Several observers have stated that when tuberculosis occurs the tonsil usually shows for a considerable time little enlargement. I have found this to be the case in the majority of instances, but certainly not in all; it not infrequently happens that the tonsil on the same side as the tuberculous cervical glands is the larger of the two. In fifty-one cases the tonsils were small, submerged, and of firm consistence: in twenty-seven cases they were hypertrophied, while in twenty-eight the tonsils were of medium size. In none of my cases in Group A was there any external evidence of tuberculosis of the tonsils.

It is of interest to state generally the condition of the cervical lymph nodes in the cases under consideration; the degree of glandular enlargement varied very much. In eighty of the cases the enlargement was slight, a gland or at most two or three glands situated a little below the angle of the jaw beneath the anterior border of the sterno-mastoid being affected and their size varying from that of a small marble to a hen's egg. In the remaining twenty-six cases there was extensive glandular affection of the cervical glands, the mass filling the carotid triangle and extending backwards beneath the sterno-mastoid into the posterior triangle as far as the trapezius.

*Group B.*—Hypertrophied tonsils removed from one hundred children were examined. Thirty-four cases were obtained from children under five and sixty-six cases from children (aged five to twelve): of these, seventy-three resided in Edinburgh and twenty-seven came from neighbouring country districts.

The clinical features of a simple hypertrophy of the faucial tonsils are so well known that they need not be recorded in detail. It will be sufficient to state that in all cases the lymph glands behind the angle of the jaw were palpably enlarged. Such an enlargement is of a toxic nature and is to be differentiated if possible from early tuberculosis of the tonsillar gland. Amongst the commonest symptoms noted were repeated sore throats, tonsillitis, and enlargement of the tonsillar glands. It is important to notice that there may be no history of attacks of acute tonsillitis in these cases—the whole process being

insidious and gradual. As in Group A, none of the tonsils showed any naked-eye evidence of tuberculosis. A history of tuberculosis in other members of the household occurred in five of the twelve cases in which the tonsils proved to be tuberculous.

These clinical data which have been personally gathered will be found to have an important relationship to the experimental results.

#### *Microscopical Examination.*

*Group A.*—Whilst the exact histological findings in several of the positive cases are described below, the following description applies to the microscopic appearances which in general may be met with in primary tuberculosis of the faucial tonsils:

The superficial squamous epithelium is intact over the greater part of the free surface, but that lining the crypts becomes so differentiated that its normal protective function becomes lost. Localised or scattered throughout the organ there are discrete or confluent tubercle follicles made up of epithelioid cells and a variable number of giant cells of the typical multinuclear form characteristic of tubercle. Caseation, although not a marked feature, occurs fairly frequently. Its absence in tubercles, immediately under the surface epithelium, may account for the rarity of superficial ulceration. There is seldom any round-cell infiltration. Tubercle bacilli in the tissues are extremely scanty and difficult to demonstrate in stained sections. The bacilli appear to disintegrate soon after the tonsils are removed. Such miliary tubercles may be situated as follows:

(1) In relation to the deeper portions of crypts, the infection remaining localised or the disease not infrequently invading the whole tonsil; (2) immediately under the surface mucosa, and near the mouth of the lacunæ; or (3) deep in the tonsil close to the capsule. Even when extensively diseased the capsule remains free and the tonsil can be readily dissected from its bed. The tubercles vary greatly in number; they may be very numerous and scattered throughout the substance of the tonsil, or only one or two may be found after examining many sections.

Forty-one of the 106 cases examined showed undoubted tuberculosis lesions in the tonsils, giving a percentage of 38. Thirty-eight of the positive results occurred in children and the remaining three in adults.

It has previously been pointed out that the lesions are not found exclusively in any portion of the tonsil. The findings in the cases examined were as follows:

- (1) In relation to deeper portions of crypts—in thirteen cases.
- (2) Immediately under the surface mucosa—in nineteen cases.
- (3) Deep in the tonsil close to the capsule—in nine cases.

I do not propose to describe the microscopic appearances of the lesions in each positive case. The following cases will serve as examples:

CASE 2, M. G.—, was that of a girl, aged three and a half, with tuberculous tonsillar glands on both sides of the neck. The tonsils were very small and hard, but presented no naked-eye signs of tuberculosis. Both tonsils were tuberculous, many tubercle follicles and giant cells, immediately under surface mucosa round the mouth of a crypt, the infection being confined to this area.

CASE 3, B. P.—A girl, aged nine and a quarter, with extensive glandular enlargement on both sides of the neck. Both tonsils were small and tuberculous,

many giant cell-systems scattered throughout the tonsil, some showing well-marked caseation; germinal centres had disappeared in places.

CASE 12, A. W. —.—A girl, aged four, with tuberculous disease of the upper carotid glands (anterior and posterior) on the left side of the neck. Tonsils small, but the left was the larger of the two. The tonsil on the affected side showed tubercle follicles and giant cells round the sides and bottom of the crypt, and also a few close to the capsule. Scattered throughout the parenchymatous tissue were also several fibroid areas.

CASE 21, L. S. —.—Girl, aged three and a quarter, with well-marked tuberculous disease of the upper carotid glands (anterior and posterior) on the right side of the neck. Tonsils small, especially the right, which was tuberculous, there being a fairly diffuse infection of the organ. Numerous tubercle follicles and giant cells were noticed round the sides and bottom of a crypt, inside which tuberculous tissue could also be seen.

CASE 48, C. W. —.—Boy, aged two, with tuberculous disease of the whole deep cervical chain of glands on right side of neck. Both tonsils small, but the right was the smaller of the two, and was tuberculous. The infection was very localised, a few tubercle follicles and giant cells being noticed close to the capsule.

CASE 61, N. L. —.—Girl, aged six, with tuberculosis of the upper carotid glands (anterior and posterior) on the right side of neck. Left tonsil small, and right tonsil of medium size. The right tonsil was freely studded with tubercle follicles and giant cells. Caseation was a marked feature. Tubercle bacilli were also found in its substance.

These histological findings are decidedly in favour of the view that tuberculosis of the faucial tonsils in children affected with tuberculous disease of the cervical glands is much commoner than observations of other authorities would have us suppose.

*Group B.*—Great cellular activity sums up the general microscopic appearances of a hypertrophied faucial tonsil. There is primarily an increase in the cellular activity of the germinal centres of the follicles. The follicles are hypertrophied and increased in number. Owing to the increase of lymphoid tissue around the crypts, the latter are reduced to simple slits, having their orifices obstructed, the accumulation of organisms and *débris* within being thus favoured. The lining of the crypts desquamates, and this accounts for the presence of plugs in the lacunæ, and renders them more liable to become infected. The lymphoid follicles may be seen to be separated by bands of fibrous tissues. It is also easy to observe irregularly-shaped inflammatory areas scattered throughout the organ.

The tuberculous lesions in Group B differ very slightly from those of Group A. Tubercle follicles, giant cells, and caseation occur, but the lesions are, on the average, much more localised. Nine (9 per cent.) of the hypertrophied tonsils examined gave histological evidence of tuberculous disease. These results correspond in general with those of many investigators.

(*To be continued.*)

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## CLINICAL NOTE.

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### NOTE ON A CASE OF NASOPHARYNGEAL TUMOUR.

By PATRICK DEMPSEY, F.R.C.S.I.,

Throat Surgeon, Mater Misericordiæ Hospital, Dublin.

At a meeting of the Otological Society, held at Dublin, May, 1902, I showed a case of nasopharyngeal tumour which provoked considerable

discussion as to its probable nature, and treatment to be adopted. The symptoms were those usually met with in this class of case, but the growth which appeared to arise from the base of the sphenoid, in addition to invading all the nasal fossæ of the left side, had also perforated the hard palate in the middle line, and spread out mushroom fashion over the entire roof of the mouth. The patient was a boy, aged twelve. Operation was refused, and the patient returned home to a remote part of Donegal, where I lost sight of him until quite recently, a lapse of more than fifteen years.

I think it is worth recording that the boy has grown into a hale and healthy man and shows no sign of his early nasal trouble, with the exception of some broadening of the nose, a small round opening in the centre of the hard palate, and slight nasal intonation.

Of the original growth no trace can be seen. I am informed that on the boy's return the tumour continued to grow rapidly, and projected so far beyond the external nares that his medical attendant conceived the idea of ligaturing the projecting portion, as high up, and as tightly as possible.

Sloughing followed this procedure, which was repeated as often as the growth reappeared, until finally, after a period of about two years, cessation of growth in this region appeared to take place, and no further treatment was adopted.

Examined three years later by a local physician, no objective signs were present, and free nasal respiration had been re-established.

It is, of course, well recognised that growths of this nature, which clinically appear so malignant, may disappear spontaneously in the course of years, if the patient succeeds in weathering the storm until adult age is reached; yet, when one is confronted with such a case as this, and has to choose between options none of which are agreeable, it is well to have definite cases as a guide, and it is with this object that I think it well to record the ultimate end of a neoplasm, for which some very drastic operative treatment was suggested, and which may still be in the recollection of some of the members of the Laryngological Section.

A report of the original discussion appears in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, August, 1902.

### OTOSCLEROSIS.

*Otosclerosis (Idiopathic Degenerative Deafness).* By ALBERT A. GRAY. Pp. xii + 197. With 20 illustrations. London: H. K. Lewis & Co. 1917.

REVIEWED BY J. S. FRASER, M.B., F.R.C.S.E.

THIS book is eminently one of those which ought to be written. It is not a mere compilation, but contains the clinical, pathological, and therapeutic observations of the author, who has evidently devoted a vast amount of time and attention to the study of the subject. Dr. Gray fully recognises the work of other investigators, but all through the book he strikes out a scientific line of his own, and, although one may profoundly disagree with many of his views, one cannot help being captivated by the charm of his writing and deeply impressed by the way in which he presents his case. It is good that a British otologist should turn out such a piece of work in war time. For these reasons



the reviewer proposes to go considerably beyond the ordinary limits of space allotted to the review of an ordinary book, and to give readers of this Journal some idea of the work which Dr. Gray has done.

In his interesting introduction the author remarks that, if a number of experienced otologists were asked to express the value they attach to the various signs and symptoms by which the diagnosis of otosclerosis is made, there would probably be found to be wide divergencies of opinion. Yet he ventures to think that there would be remarkable agreement in respect of the cases which they would class under the term "otosclerosis" and he is strongly of opinion that pathological examination would show that the diagnosis in the great majority of cases was correct. Gray frankly confesses that formerly he frequently overlooked cases of otosclerosis which were combined with the presence of past or present suppurative middle-ear disease. It is perhaps a pity that he does not go more fully into the question of diagnosis. Many cases of otosclerosis are being treated by inflation, massage, etc., with the hope of improving the hearing. It takes a long time for clinical assistants and for the patients themselves to find out that such measures are useless—mere wasters of time and energy.

All the photographs and photo-micrographs in the book have been taken by the writer himself. No touching-up has been allowed. When flaws were present in the sections they have been allowed to appear in the prints. One wishes that many foreign investigators would adopt this very honest attitude instead of getting artists to make drawings of what they see—or think they see—in their microscopic sections.

Chapter I deals with *age* and *sex*. Otosclerosis manifests itself usually between the twentieth and fortieth year. The disease is very rare before the age of ten, considering the large proportion of the population alive during that first decade. Such cases are usually associated with suppurative middle-ear disease. Of 95 cases of otosclerosis observed by the writer, 69 were females and only 26 males. The first decade included 6 cases, the second 24, the third 39, the fourth 15, the fifth 6, and the sixth 5. Gray finds that in the four earlier decades the ratio of frequency of otosclerosis in women undergoes an increase. He holds that between the ages of ten and twenty changes take place in the body which increasingly determine the occurrence of otosclerosis, and that these changes become still more pronounced between twenty and thirty, after which they appear to diminish.

Chapter II is concerned with heredity as a factor in the occurrence of otosclerosis. Formerly it was only among cases of the affection known as "dry catarrh" that heredity was admitted to be a factor. Gray holds that this rigid view must be abandoned. Any attempts to draw a distinct line between cases of otosclerosis due to inherited tendency and those which are not, are doomed to failure. He believes that there has been considerable neglect of the study of heredity in relation to disease on account of the unfortunate dominance that the study of bacteriology has gained over pathology, and also on account of the phenomenal outburst of surgical activity which has drawn away much attention from the study of non-suppurative disease of the ear. A third difficulty is that of obtaining accurate data. "It appears to be an article of faith with some individuals that no qualities are inherited in their own particular family except those which are desirable. For this reason we must never accept the patient's statement that there is no deafness in the family."

In dealing with this aspect of otosclerosis Gray provides his readers with fourteen tables giving the family trees in many of the cases observed by himself. Appended to each table we find an account of the clinical examination of all the cases he has personally observed, along with careful and scientific hearing tests. (One notes that he does not attach any importance to Gelle's test, as he does not find it reliable.) Table 2 is of particular interest. On both sides the families were only very slightly burdened by deafness. Neither the father nor the mother of the present generation were deaf, and yet, of the nine children of this marriage, six are already the victims of otosclerosis, and of the three who are not deaf, one has not yet reached the age at which her brothers and sisters became affected. The third "tree" is concerned with a family in which the disease was handed down from the mother's side, and in which three out of ten children are at present suffering from the affection, but several have not yet reached the age at which the disease usually develops. One is rather surprised to note that the author does not lay much stress on what appear to be undoubted signs of nerve-deafness (mixed middle- and inner-ear deafness) in several of his cases of otosclerosis (pages 26, 27, and 28). On page 35 we find an interesting case—that of a woman of forty-one, who, as a girl of twenty-five, suffered from acute pain and deafness in the left ear after exposure to a cold east wind. There was acute pain in the ear, but never any discharge. The deafness remained and tinnitus developed some years later. The right ear remained well till three years ago, when deafness and tinnitus supervened a few months after an attack of appendicitis. The noises disappeared some months after operation for this affection.

The most marked instance of inheritance is found in Table 8. Here both father and mother appear to have had the disease, and of seven living children four have already become affected. Gray also figures Hammerschlag's well-known family tree. A man, the victim of otosclerosis, married his niece, who also suffered from the same condition. All of the seven offspring became deaf.

In Chapter III the author brings his great knowledge of the comparative anatomy of the ear to bear on the question of otosclerosis. He first of all points out that, apart from hereditary influence, there is no single cause to which otosclerosis may be attributed. Attempts to ascribe all cases of otosclerosis to disturbances in the internal secretion, to toxic absorption, to syphilis, etc., cannot be accepted, although in a given case any one of these may be the exciting cause. Gray holds that there is no justification for the view that in all cases the exciting cause is to be found in past or present inflammatory processes in the middle ear. In certain families, when the hereditary influence is pronounced, the disease appears to arise at an earlier age in each successive generation. Mott has come to a similar conclusion in respect of certain nervous diseases.

Gray admits, however, that the age of onset of otosclerosis may be very greatly affected by local inflammatory activity in the middle ear. This reminds the reviewer of the view held by certain German observers—notably Alexander—with regard to ozæna. They consider that ozæna is a hereditary complaint, but that it only manifests itself after an attack of acute purulent rhinitis. Of the two factors in the production of ozæna—heredity and inflammation—the first can hardly be avoided, unless we are prepared to interfere very extensively with

the free choice of individuals as regards marriage. It is in connection with the second of the two factors that we are able to do something—*i.e.* by the prevention or cure of the inflammatory condition. The reviewer suggests that our attitude towards otosclerosis must be very similar. Gray himself advises that the children of parents who are the victims of otosclerosis should be guarded with especial care against every possible factor which may tend to middle-ear disease of any kind. In all cases of deafness, even in children, the family history should be inquired into, and if there is evidence of a tendency to otosclerosis, the prognosis should be guarded.

Gray pertinently asks—How did the condition originate? It can hardly be imagined that there is an unbroken descent of actual cases of otosclerosis from the time when the organ of hearing first made its appearance in the animal kingdom. The disease must have originated some time in the history of the race, and, that being so, is there any reason why it should not occasionally originate in the present time? It certainly exists in animals. Gray ventures to think that the answer to his question is to be found in the evolution of the organ of hearing. The simplest form of labyrinth is that of the very primitive hag-fish. In many fishes, however, the labyrinth is exceedingly complex; indeed, so far as the vestibular apparatus is concerned, this organ never again reaches such a degree of complexity. In the diploid fishes there is no rudiment of a cochlea, and in the lepidosiren there is no trace of any opening in the labyrinth corresponding to the oval or round windows, nor any chain of ossicles or tympanic membrane. In the less specialised amphibia there is no macula basilaris, nor any sign of a cochlea nor of the windows. In the reptiles the labyrinth for the first time gives evidence of having acquired a new function—the sense of hearing—and the corresponding anatomical changes are almost universally found in this class. From the macula lagena there has been evolved the macula basilaris, which is destined to become the basilar membrane and organ of Corti of the more highly specialised reptiles, birds, and mammals. The oval window is present in most reptiles. In sphenodon and in the chelonians there is only a slight bulging of the capsule of the labyrinth to represent the cochlea. In the crocodilia the bony tube of the cochlea is still larger and is definitely bent in itself. While these remarkable changes are going on in respect to the oval window and the cochlea, the other parts of the labyrinth (vestibule and canals) remain practically stationary. Among the mammals themselves the monotremes offer a remarkable similarity to the reptiles as has been shown by Pritchard. In the eutherian mammals the cochlea is still undergoing a progressive evolution, and consequently causes alterations in the bone which surrounds it. The cochlear tube, increasing in length, takes on a spiral form, and the surrounding bone is channelled out into a similar shape. The human cochlea is supplied by the largest number of nerve fibres. We thus see that the semicircular canals and vestibule reach their full development in fishes and have made no further advance. The oval and round windows, the ossicles and the cochlea have all been evolved since their first appearance in the amphibians. “Even those biologists who still believe in the transmission of acquired characters . . . would not maintain that such a condition as otosclerosis . . . could be transmitted . . . as a pure modification resulting from environment.” Gray therefore holds that otosclerosis is a variation, using this term in its biological sense. Hence the condition may arise apparently

spontaneously and yet be transmitted. This view enables us to understand why, although a large number of cases are obviously hereditary, there remain not a few in which the affection apparently arises *de novo*. The fact that a generation is sometimes "skipped" merely means that the tendency to variation has lain latent, only to be revealed in subsequent generations. The primary fault is an inherent defect in the living cells of the organ of hearing. All other general constitutional conditions are merely contributory, while local pathological changes in the middle ear are not essential to the incidence of the disease. This view of otosclerosis explains many of the curious phenomena associated with the condition—*e. g.* the absence in almost all cases of any interference with the function of the vestibule and semicircular canals. As Gray points out, variations are more apt to occur in structures that are of comparatively recent origin than in those of more ancient descent. For this reason otosclerosis selects the foot-plate of the stapes, the bony walls of the cochlea, and, in some cases, the nerve structures of the organ, while it almost invariably leaves the other portions of the labyrinth untouched. Gray holds that his theory effects a reconciliation between the views of those who, like Manasse, hold that otosclerosis is primarily an affection of the nerve structures of the cochlea, and the view of many other otologists who look upon the condition as primarily a disease of the bone. The nerve structures are evolved hand in hand with the bony channel which contains them, and the variation is liable to affect both.

Chapter IV deals with pathological anatomy. At the beginning, Gray gives an interesting and lucid account of his method of preparing thin serial microscopic sections of the labyrinth. He holds that celloidin sections are at the best rather thick, and therefore he has devised what he considers on the whole a more satisfactory method. It would take too long to give an account of his technique, but it is sufficient to say that, after the specimen has been embedded in celloidin the latter substance is removed and replaced by paraffin. Before cutting, the surface of the block must be softened in alcohol and glycerine. The advantage of Gray's method is that thinner sections are obtained, and the objections are the time and patience required and the risk of destroying the preparation during the numerous processes entailed.

Gray's first case is that of a female, aged thirty-five, who suffered from phthisis pulmonalis and died from hæmoptysis three months after clinical examination of the ears; dulness of hearing first noted three years before death. Gray found normal tympanic membranes; whispered voice heard at 2 ft. (right) and 9 in. (left); Rinne negative; Schwabach lengthened; low tones lost. At the *post-mortem* the left middle ear contained a large amount of bloody serum of obviously recent origin. Microscopic examination of the labyrinth capsule showed normal appearances in all parts except over a very small region in front of the oval window. The affected area stained more deeply with hæmatoxylin than the surrounding bone, and did not quite reach the endosteum of the cochlea. The muco-periosteum of the middle ear was slightly thickened over the affected area. Osteoclasts were almost entirely absent except near the sharp line of demarcation between the diseased and the normal bone. *There was no sign anywhere of an inflammatory process.* The new-formed spongy bone extended right up to the stapedio-vestibular articulation, but at no point passed beyond this limit. The stapes thus remained free from bony union. The



membranous structures of the labyrinth showed no sign of pathological change. The left ear showed similar conditions.

Case 2 was that of a female, aged forty-nine, who also suffered from consumption and died three months after examination of the ears. For one year before death she had suffered from dulness of hearing, tinnitus, and paracusis. There had been one or two slight attacks of giddiness. Gray found the right tympanic membrane normal. *The left drumhead showed a large perforation* (italics reviewer's). Whisper heard at  $1\frac{1}{2}$  ft. by the right ear and C.V. at 3 yds. Left ear unfortunately not tested. Schwabach lengthened; Rinne negative. Microscopic examination of the right ear showed a condition not hitherto described. The affected area was in the usual position and was extremely small and did not involve the stapedio-vestibular joint. There was *no evidence of the occurrence of new-formed bone* which has hitherto been considered an invariable feature of otosclerosis. In the affected area the bone stained less deeply than the normal bone, and the spaces were almost completely filled by blood-vessels. The membranous structures of the labyrinth appeared to be normal. The left ear showed a large perforation of the drumhead, while the *attic and antrum were filled with cholesteatoma* (italics reviewer's). Microscopic examination of this ear showed that in other respects the conditions were identical with those on the right side. We must note with thankfulness that Gray describes the macroscopic and microscopic changes as shortly as possible and does not spin out his account to the inordinate length beloved of German observers.

Case 3 also related to a female, aged fifty-five, who had been *deaf in both ears for more than twenty-five years*. She had also suffered from tinnitus. Examination showed an old scar in the right drumhead, while both membranes were noticeably indrawn. (Holding the views he does regarding the pathology of otosclerosis the reviewer cannot resist calling attention to the fact that, in Cases (2) and (3), there was evidence of past or present otitis media, while even in Case 1 there was an exudate present in the left middle ear at the time of death. This points to a liability to otitis media.) Functional examination of Case 3 showed lengthened bone conduction, an absolutely negative Rinne, and loss of upper tones. On microscopic examination of the right ear a diseased focus was found in the usual situation, extending from the endosteum of the cochlea to the muco-periosteum of the tympanum. The foot-plate of the stapes was ankylosed by a thin bridge of bone. The new bone stained hardly any deeper than the normal bone, and Gray holds that this shows that the new formation took place many years before and had been long inactive. The membranous structures of the labyrinth appeared to be normal, but, as he correctly says, our present methods of microscopic examination are far too crude to elucidate changes which we know on other grounds must be present. The left ear in Case 3 showed an indrawn drumhead and exostoses on the promontory. It is interesting to note that though the stapes did not show any evidence of fixation on naked-eye examination or on touching it with a probe the microscope proved that it was fixed by ankylosis.

Case 4 had not been examined clinically. The patient was again a female and was aged eighty-five. *The symptoms had existed for sixty years*. Only the left ear was examined. The stapes was ankylosed and the niche of the round window narrowed by hyperostosis. The internal auditory meatus was also small and the vestibule reduced in size. The

foot-plate of the stapes was greatly thickened and fixed by bone at both extremities. There was a large area of rarefied bone between the posterior margin of the oval window, the facial nerve, and the lateral canal. This has never hitherto been described.

The photo-micrographs illustrating these four cases are very beautiful, and Dr. Gray may well be proud of them. There is no doubt that he is able to obtain exceedingly thin sections by his method, and that he can produce high-power photo-micrographs which are far better than those obtained from celloidin sections. On the other hand, bits of the section have apparently dropped out in some of his specimens, notably Case 2, Fig. 8. As he says, there are both advantages and disadvantages in his method. The reviewer begs to call Dr. Gray's attention to an error in the lettering of Case 4, Fig. 16. The lower "h" does not indicate the horizontal canal but refers to the posterior vertical canal, while the "p" below indicates the *crus commune*.

Chapter V includes a general consideration of the pathological changes. Gray holds that there are three types of changes in the bone in otosclerosis: (1) By far the most common is that in which absorption is followed by deposition, the new formed bone being in excess of that absorbed. (2) A type in which the absorption is followed by deposition but the new formed bone falls short in amount. (3) In this third type absorption occurs without any subsequent deposition. (As far as the writer is aware the second and third types have not previously been described.) Gray agrees with Siebemann and Bruehl that the change is not associated with chronic inflammation. He thus opposes Habermann's view. Gray's explanation of the peculiar location of the disease focus in the anterior margin of the oval window is as follows: Chronic catarrh in the nose or naso-pharynx leads to more or less Eustachian obstruction, with resulting indrawing of the tympanic membrane and chain of ossicles. Owing to the inward pressure the ligamentum annulare is in a constant state of hypertension, and transmits the stress to the walls of the oval window and the bone in the neighbourhood, as described above, with the result that in those, in whom there is any tendency to otosclerosis, the bony change is prone to manifest itself in that region. Attention is called to the fact that in Cases 1 and 2, which were of comparatively short duration, there was no ankylosis of the stapedio-vestibular joint. In Case 3 the disease had lasted twenty-five years, and there was a bony ankylosis though only an extremely fine ridge; while in Case 4, in which the affection had been present for over sixty years, the foot-plate of the stapes was united by bone all round its circumference. From this it would appear that ankylosis is not an early feature of the disease, and perhaps may never occur at all. Clinical evidence shows that the sound perceiving structures ultimately tend to become involved, and Manasse has proved this by microscopic demonstrations. Gray suggests that changes should be looked for in other parts of the organ of hearing, *e.g.* the cerebral cortex, the basal auditory nuclei and the nerve-fibres in the middle ear. Tinnitus may really be due to changes in the cerebral cortex and not to those in the labyrinth at all. Such a supposition would explain why mental worry has such a bad effect on the course of the disease, and also why destruction of the cochlea and section of the auditory nerve do not always cure the tinnitus. Gray points out that pathological changes are much more easily observed in bone than in nervous tissue, because bone is a much more active structure. Gray now regards oto-

sclerosis as a degenerative process, but it is permissible to remind him that at one time he spoke of it as an aseptic necrosis probably due to aseptic infarction, and also (at a recent meeting of the Otological Section) he suggested that otosclerosis might be of the nature of tumour growth. As supporting his theory of a degenerative process he reminds us of the diminished secretion of wax in, and of the loss of sensitiveness of, the external meatus.

The reviewer would suggest that Dr. Gray, Mr. Jenkins, and others who have worked at otosclerosis should submit their microscopic preparations to some of the best known pathologists in the kingdom and ask for opinions as to the nature of the pathological process—degenerative, inflammatory, etc. Gray himself suggests still another name for the disease, "idiopathic degenerative deafness." The term "idiopathic" is used in the sense that the disease is liable to occur in certain individuals and can occur in those individuals only, while the word "degenerative" indicates that the disease is a retrograde process and not an inflammatory one.

Gray gives a short note of the work of Dr. Hunter Duncan, who has carried out an analysis of the blood from 71 patients—44 normal and 27 otosclerotics. He found the chlorine and also the sulphur trioxide below the normal and the calcium three times greater than normal in the blood of otosclerotics. More work on these lines might be of advantage.

The last chapter (No. VI) deals with prognosis and treatment. Gray attaches great importance to the general condition of the patient. As regards otosclerosis, the human race may be looked upon as "a series in a scale." At one end are found individuals in whom the potentiality for developing otosclerosis may be considered negligible, and in these otosclerosis cannot be produced; at the other end are those in whom the potentiality is exceedingly strong, and in whom "practically no special stimulus" is necessary to call otosclerosis into existence. (Here the reviewer cannot agree. A stimulus is necessary, and that stimulus is otitis media.)

There can be no routine treatment for otosclerosis: every case must be a study in itself. Gray, of course, admits that the results of treatment, so far as improvement goes, are generally unsatisfactory. Some cases steadily become worse in spite of all or any treatment. In a large number, especially in the very early stages, the disease may be arrested or greatly retarded. In a few some improvement may be obtained. Gray has not seen a case in which the hearing was restored to normal. If the affection comes on early the outlook is extremely bad. Gray points out that, if otosclerosis were an inflammatory condition, exactly the reverse of this would be expected. In this particular otosclerosis resembles malignant disease, arterio-sclerosis, and diabetes. Cases with hereditary otosclerosis are unfavourable; while, if tinnitus is marked, the case is likely to progress rapidly because, in such an individual, the nerve structures are particularly involved, and there is therefore little hope of improvement. The only exception to this rule are cases in which the affection arises in women during chlorosis. Paracausis is a bad sign as regards improvement by treatment, but is otherwise good because such cases tend to progress rather slowly. In the pure form of the disease unassociated with catarrh of the pharynx or middle ear, a moist climate has no particularly bad effect, but severe cold (whether dry or moist) is unfavourable. Gray lays great stress upon diet, and

states that meat, which permits of considerable toxin formation, has a bad effect. Alcohol, tobacco, strong coffee and tea are also unfavourable. The injurious effect of pregnancy and the puerperium have been rather overestimated. Gray gives some very interesting case histories showing the results of his treatment, but it is best to allow the reader to absorb this for himself. Dieting, laxatives, intestinal antiseptics, the elimination of septic foci, vaccine treatment, are all dealt with. Gray holds that we can do something better than merely tell the patient to learn lip-reading or to use an artificial aid to hearing. The value of the former has been considerably exaggerated. He holds that Heath's method of applying blistering agents to the tympanic membrane is not based on any definitely known facts of the morbid anatomy of the disease. Gray has treated twelve cases according to Heath's method. In not a single instance was there any improvement in the hearing at any time. After the discharge and reaction which result from the blistering have ceased, a number of the patients are convinced that they hear better. Tests, however, show that there is no real improvement, and that, when the reaction subsides, the hearing only returns to its former condition. In one case the drumhead became perforated under treatment, and the patient has since suffered from short attacks of otorrhœa. Several of Gray's patients have also been treated by the Zund-Burguet method but not by Gray himself. None of these patients were benefited either as regards hearing or tinnitus. As Gray remarks, the great majority of people suffering from deafness can be "easily persuaded that they hear better as the result of treatment of any kind directed to the ear." Gray has tried a method of his own, which consists in inserting small pellets of compressed cotton-wool into the meatus up to the drumhead. When the meatus is almost full, an india-rubber cork is inserted tightly, so that as the cotton-wool expands, the drumhead along with the ossicles are gradually pressed inwards. Of six patients treated in this way four stated that the hearing was distinctly better. The remaining two said they were not improved. Hearing tests, however, showed that *no change had taken place in any of them*. Finally, Gray suggests that any aurist who wishes to establish a claim as to a new method should first submit the patients to inspection by unprejudiced observers, and then, after treatment, again have them examined by those who had made the preliminary inspection. One wishes that everybody would take this scientific and straightforward advice.

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### Abstracts.

#### EAR.

The Organ of Hearing in War.—Prof. E. J. Moure and P. Pietri.  
"Revue de Laryngologie," April, 1917.

*Cerebral Deafness.*—The condition thus defined by the authors is a psychosis. The following are the salient points of the article, which is lengthy.

Functional tests enable us to decide between an affection of the cochlea, or vestibule, or both. If there be disagreement between the various tests, the factor of exaggeration may be responsible.

The literature gives no idea of any symptom-complex characteristic of auditory psychoses. But the patient, whom the authors designate as



"cerebral," shows a hebetude, apathy, indifference to his surroundings, disinclination to be questioned, or to assist the expert in examining him. Whereas the truly deaf man attends to the facial expression of his interlocutor, tries to lip-read, holds forward an ear to listen. In contrast with both the two preceding types, the exaggerator shows a striking discrepancy in hearing-tests if these be repeated several times, avoids the examiner's eye, and in some way, as by blushing or confusion, shows self-consciousness if personal remarks are made about him.

*Clinical Signs.*—Increased, diminished, or total loss of hearing. Anæsthesia of membrana tympani—partial only, never absolute. Hyperæsthesia of the skin of pinna and mastoid occur; but may disappear while the patient's attention is directed to something else which interests him. Before labelling such cases "hysterical," we must construct a more complete syndrome by finding characteristic stigmata of vision, smell, and neural function.

Menière's triad may be found; in such cases it is fortunate that the vertigo, which most distresses the patient, disappears earlier than the tinnitus and deafness, which he finds more easy to bear.

*In prognosis*, the most important factor is the near or remote prospect of return to the Front.

*Treatment* is by rest, sedatives, tonics, mastoid counter-irritants, and auditory re-education.

Among tests for simulated deafness, Dundas Grant's is most useful. The patient's pupils, after a brief contraction, dilate if he really hears a sound—such as a whistle.

To evoke reflexes by the sudden dropping of a heavy weight is an unreliable test, for we know that the absolutely deaf may have a heightened appreciation of vibration, so that, for instance, they are quick to recognise the step of anyone marching at their side.

Lombard's use of Bárány's noise-apparatus is commended as a test.

If a patient suffers from unilateral cochlear or cerebral deafness, a tuning-fork on the vertex is referred to the healthy side; if the meatus be closed, the sound will be intensified. A malingerer will imagine that by closing the meatus of the only side with which he claims to hear, he should be made totally deaf; he will fall into the trap by saying that now he does not hear at all (Moure).

Other well-known tests with tuning-forks, auscultation-tube, and clothes-brush are described.

The authors point out that a man who is truly deaf and has learned to lip-read, can do so equally well with a noise-apparatus working in his ear, whereas the malingerer appears to learn lip-reading, but is helpless when the noise-apparatus is applied.

H. Lawson White.

#### The X-ray Diagnosis of Mastoiditis.—Amberg. "Laryngoscope," 1916, p. 7.

The author reports a case in which the diagnosis between furunculosis and mastoiditis was very difficult until the Röntgenologist reported the mastoid intact. Under gas anæsthesia Amberg liberated a teaspoonful of pus, and the patient promptly recovered. The writer also records several cases of acute suppurative otitis media with slight tenderness over the mastoid, in which X-ray examination showed a healthy mastoid, and in consequence operation was not performed. In addition, Amberg mentions cases in which the radiogram showed that operation was advisable, and in which the operative findings confirmed the Röntgenologist's.

Amberg even goes so far as to suggest that people should have an X-ray record of their mastoids in health (presumably with a view to the development of future disease). The writer maintains that the X rays may enable us to diagnose a tumour affecting the temporal bone when this is not possible by other methods. He mentions Cheatle's work and reminds us that out of 120 pairs of temporal bones 82 were symmetrical and 38 asymmetrical. Amberg quotes with approval the conclusions of Leidler and Schueller regarding radiograms of the ear: The mastoid process is always distinctly recognisable. We can see its shape, whether long or short, broad or narrow—whether it is diploetic, pneumatic, or mixed. We can judge the size and arrangement of the cells. A terminal cell, if present, is most plainly visible. We also note the shape, size, and position of the external meatus, which appears as a round or oval lighter area in which one sees the details of the internal auditory meatus and sometimes also of the cochlea. The petrous bone presents itself as a triangle, sometimes long and narrow, sometimes short and broad. In children the pyramid forms an oblong, narrow triangle. The vestibule and canals can be made out much less often than the cochlea. The vestibulum always borders posteriorly and upwardly upon the inner auditory canal. In the radiogram the vestibule appears behind and above the internal meatus, while the cochlea is seen below and in front. The size of the clear area which represents the internal meatus is at most one-third the size of that representing the external meatus. The cochlea and semi-circular canals, which are plainly visible in temporal bones of children, can be seen in adults only imperfectly. The posterior semi-circular canal is most easily seen. Occasionally the thickness and position of the tegmen can be determined directly (frequently in children). The antrum is most plainly visible in young children, forming a well outlined, lighter area within the pyramid, behind and above the outer external canal. The antrum is much more clearly visible in pneumatic types of bone. Though one cannot be sure about its depth, the sinus is plainly visible in all specimens. The jugular bulb is frequently visible as a more or less plain lighter field in the spongiosa of the pyramid in the posterior part. The emissary vein is always plainly visible. Amberg's article would be greatly improved if legends had been attached to the reproductions of his radiograms (Abs.).

J. S. F.

## NOSE.

**Texas Screw Worm Infection of the Nose, Accessory Sinuses, and Throat**  
—Sidney Israel. "The Laryngoscope," September, 1915.

The screw worm is chiefly found in the tropical and subtropical regions of North and South America. It attacks cattle and various lower animals. Screw worm infection has been known to cause death. The infection is produced by flies, which deposit their eggs in an open wound or foul-smelling discharge. The eggs hatch rapidly, and the young maggots invade the tissue. Complete growth of the maggots occurs in five or six days, after which comes the pupa stage, and the flies are developed from four to fourteen days later. In Israel's cases there was syphilitic infection of the nose with the usual offensive odour. Israel holds that a chloroform spray applied directly to the involved area gives the best results, and only causes slight injury to the mucosa. After the region has been thoroughly sprayed the worms are removed by

intranasal forceps only, to avoid injuring the mucosa. The following case is recorded: Male, aged thirty, a heavy drinker and smoker. The patient had syphilis seven years ago, and three years ago suffered from nasal obstruction, which he tried to relieve by inserting a hairpin. Sense of smell and taste diminished. On June 28, 1914, patient fell asleep under a tree, and two days later complained that his face was swollen. He became delirious. His wife stated that three worms came away from the right side of the nose. On admission to hospital the temperature was subnormal, pulse 132. A cadaveric odour was present, and the patient appeared about to die. It was found that the nasal septum had entirely disappeared, and that the bridge of the nose had collapsed. The nasal cavity was filled with screw worms. The inner wall of the maxillary antra had disappeared, and these cavities were also filled with worms. The same conditions obtained in the frontal and sphenoidal sinuses. The hard palate was perforated, and the pharynx and tonsils also contained worms. A chloroform spray was used, and most of the worms came away easily, but in some regions the worms were very tenacious, and had to be cut out with a knife. The chloroform spray was repeated every two hours. Delirium continued for three days, and a week later there was severe exophthalmos of the right eye due to retrobulbar abscess, which was evacuated. Four days later there was swelling of the right temporal region due to partial necrosis of the frontal bone, while later still an abscess formed at the angle of the lower jaw. Cultures from these abscesses showed *Staphylococcus aureus*, and accordingly a vaccine was administered. Three weeks after admission to hospital salvarsan was injected. Good recovery.

J. S. Fraser.

## ŒSOPHAGUS.

Cancer of the Œsophagus developing in a Scar.—Drouin and Georges Canuyt. "Rev. de Laryngol., d'Otol., et de Rhinol." May 15, 1917.

In this remarkable case, related in detail, the patient died of a sudden violent hæmorrhage. And the autopsy revealed a broncho-œsophageal fistula and a perforation of the aorta.

The salient points are as follows:

(1) The bronchial perforation was 4 c.m. in diameter, and had the appearance of being old. Yet auscultation had at no time revealed anything abnormal, beyond a generalised bronchitis.

(2) Although it is easy to trace cases of perforation of either the aorta or a bronchus by a similar growth, this appears to be the only recorded case in which both of these structures were perforated.

(3) Œsophagoscopy, carefully performed three times, never revealed more than a stenosis.

(4) *Post-mortem*, the aortic wall limiting the perforation was found to be very thin. Yet neither three œsophagoscopies, nor the repeated passage of sounds up to 33 mm. diameter, had ever resulted in accident. The fatal hæmorrhage was spontaneous.

The authors sum up their attitude in the controversy as to the use and abuse of gastrostomy, by saying that it is a humanitarian operation which permits a patient to die of cancer instead of inanition.

This case should be read in the original report.

H. Lawson White.

**Malformation of the Œsophagus.**—Edmund Cautley. "British Journal of Children's Diseases," vol. xiv, Nos. 157-159, January-March, 1917.

Cautley states that malformations of the œsophagus are of sufficient rarity to make each case worth recording. He classifies the various types as follows: (i) Complete absence; (ii) double œsophagus; (iii) diverticula or pouches; (iv) cysts; (v) tracheo-œsophageal fistula; (vi) congenital dilatation; (vii) atresia without fistulous communication with the trachea; (viii) atresia with the lower end of the œsophagus opening into the trachea, or very rarely into a bronchus.

The author's case, the son of Belgian refugees, was of the latter variety. The anatomical condition proved to be a *cul-de-sac* ending about 1½ in. above the bifurcation, the posterior wall of the œsophagus blending with that of the trachea.

Cautley states that the symptoms are characteristic and the diagnosis easy. On account of the obstruction, fluids by mouth are regurgitated through the mouth and nose. The accumulated mucus and saliva trickle from the mouth and nose, and appear as a bubbly secretion at the exterior nares from being mixed with air from the lungs. Attacks of suffocation and cyanosis occur, probably as the result chiefly of the regurgitation of fluids from the stomach into the trachea, and sometimes from fluid passing from the mouth through the glottis. The passage of a catheter reveals obstruction—in the common type at a distance of 10-12 cm. from the gums. In type viii the stomach may be distended with air, passing into it from the trachea, and stand out as a prominent swelling in the upper half of the abdomen, the lower half being retracted and empty. Bronchitis or broncho-pneumonia is often present. Death ensues in a few days, usually four to five, but life has been prolonged by gastrostomy for fourteen days. Cautley does not consider operation justifiable except for simple stenosis. The treatment consists in dilatation by graduated bougies.

J. B. Horgan.

## MISCELLANEOUS.

**Leucoplakia Buccalis et Lingualis.**—Robert Levy. "The Laryngoscope," August, 1915, p. 539.

Levy states that the essentials leading to a practical understanding of leucoplakia are still unsettled. He records the following case: Male, aged seventy, was a non-smoker and denied syphilis. One brother had died of cancer of the stomach. Eight years before admission the patient first noticed pain in his mouth after the extraction of a tooth. This was followed by painful ulceration. Levy found plaques of irregular outline on the right cheek and on the gums of the lower jaw. Bacteriological examination were unsatisfactory, all sorts of organisms being found. Treatment was continued for two years, but did no good, and the disease became more extensive. A general surgeon was, therefore, consulted. The latter found an indurated mass involving the alveolar process at the angle of the right lower jaw. Microscopic examination confirmed the diagnosis of cancer. The right common carotid was ligatured, and the right half of the inferior maxilla resected. The growth had extended into the muscles, which were removed, together with the parotid gland. On discharge no areas of leucoplakia remained. The patient remained well for three years, but then noticed a return of white spots, and



a papilloma was found inside the right angle of the mouth. The growth was removed, and, on microscopic examination, showed no signs of malignancy. One year later a tumour in the mouth was treated by fulguration, which did good, but caused great pain. The patient declined further treatment.

Levy goes into the pathology of leucoplakia, and states that, according to Shoemaker, the condition is essentially a chronic inflammation of the mucous membrane with infiltration, localised cellular hyperplasia and keratinisation of the epithelial layer. The following varieties have been described: (1) Idiopathic, (2) syphilitic, (3) arthritic, (4) smoker's leucoplakia, (5) glass-blowers, (6) the variety due to wearing dental plates, (7) mixed cases. Leucoplakia has been reported in the following regions: Faucial pillars, tonsil, epiglottis, arytenoids, in addition to the usual situations on the cheeks, gums, tongue and palate. Barker has found it on the prepuce and anus, while Butlin has reported it on the vulva. Lecene has noted a case in the pelvis of the kidney.

*Etiology.*—In some individuals the mucous membrane of the mouth is more susceptible to irritants than in others, but the two most important aetiological factors are syphilis and tobacco, indeed, Landousy states that the former is indispensable, while the latter is a valuable contributory agency. Joseph has never seen a case where the patient had not been a heavy smoker, and believes that the condition has nothing to do with syphilis, except in so far as the latter may be a predisposing cause in smokers. Guerini holds that, when leucoplakia is due to syphilis, it occurs on the tongue, when due to tobacco it occurs on the lips or cheeks.

Barker divides the pathology into three stages: (1) Slight thickening of the epithelium, (2) greater thickening with a horny change in the cells and an exudation of leucocytes in the papillary layer, (3) thick horny plaques with atrophy of the papilla. The place of the latter is taken by inflammatory exudate. Beffel considers leucoplakia a benign epithelial growth usually confined to the tissue external to the basement membrane. In advanced cases it penetrates this membrane and invades the connective-tissue—thus becoming an epithelioma. Vilanova speaks of two forms of degeneration: (1) papillomatous (benign form) and (2) epithelioma (malignant). Joseph states that the spectre of cancer stands in the background of every case of leucoplakia, though the malignant degeneration may take thirty years to develop. When involving the tongue cancerous degeneration occurs more frequently, more constantly, and earlier than in leucoplakia elsewhere. Mantilla has collected 556 cases, of which 158 (31 per cent.) developed epithelioma, and Barker states that those who are predisposed to cancer by birth or surroundings offer a suitable soil for leucoplakia. The proliferation of the younger cells takes place under the horny layer, and, as they cannot be thrown off, they burrow under the papillary stratum to form a cancerous nodule. According to Leloir epitheliomatous degeneration begins either at an ulcerated surface, or, more commonly, at a fissure. With regard to the relationship between trauma and cancer, Levy states that no one has yet succeeded in producing cancer experimentally in animals by trauma, though none can deny the frequent occurrence of cancer in spots subject to long-continued irritation. With regard to the clinical manifestations indicating cancer, Marie holds that pain radiating to the ears, enlargement of the submaxillary glands, and induration of the plaques are of great importance, while Barnard is of opinion that wart formation, ulceration, fissuring and nodule formation are signs of malignant degeneration.

*Treatment* is unsatisfactory. Dittirch has obtained a cure with the actual cautery, while others resort to excision. Vilanova uses the knife or radium. Gaucher and Barber have reported two cures by mercurial treatment. All are agreed on the importance of oral hygiene, the use of mouth washes, and the removal of all sources of irritation. Levy himself recommends high frequency currents. *J. S. Fraser.*

**The Effect of Various Atmospheric Conditions upon the Upper Respiratory Tract.**—Gerhard H. Cocks, "The Laryngoscope," September, 1915, p. 603.

Cocks holds that we may discard the chemical constituents of the air as of no great importance. The effects of poor ventilation can no longer be explained by the presence of volatile organic poison in the air. The principal factors are humidity and air movements. Hermans was the first to suggest that the bad effects of poor ventilation are due to the inability of the body to cool itself because of the increased temperature and moisture of the surrounding air. The capacity for heat regulation depends largely upon the vaso-motor system and the sweat-glands. The amount of heat lost from the surface of the body by radiation and conduction depends upon the temperature of the surrounding air, the amount of heat lost by evaporation upon the humidity. Resistance to infection is supposed to be influenced by cold. Pasteur found that, although the common fowl is not susceptible to anthrax, it becomes susceptible when made to stand overnight with feet in cold water. Rabbits and guinea-pigs chilled in various ways are much more susceptible to inoculation with bacteria than control animals. Vaso-motor contraction of the skin-vessels due to cold is accomplished by reflex dilatation of vessels in other parts of the body. Severe muscular exertion in hot, bad air leads to active dilatation of the vessels of the respiratory mucous membrane, and if there now follows a sudden exposure to cold a condition predisposing to catarrhal inflammation is produced. Leonard Hill has observed that the nasal mucosa became swollen and red in warm, moist air, accompanied by a marked increase in the secretions. Warm, dry air produces less swelling and secretion. On passing from warm to cold air Hill found that the nasal mucous membranes became paler but still remained swollen—a condition which predisposes to disease because the defensive mechanism of the blood (the immunising properties of the plasma, the cleansing action of the cilia, and the phagocytic action of the white blood-cells) are all diminished by cold. Mueller has noted vascular stasis in an exposed part subjected to severe cold, and found that the blood undergoes chemical changes, resulting in the disseminating of poisonous products. Cocks has experimented with two rooms so arranged that any desired degree of temperature and humidity could be secured. Cocks considers the normal temperature of a room to be 68° F., normal relative humidity 50 per cent.; cold room, temperature 50° F., relative humidity 50 per cent.; hot, dry room, temperature 80° to 86° F., relative humidity 20 to 30 per cent.; hot, moist room, temperature 80° to 86° F., relative humidity 80 per cent. Cocks has used his modification of the Glatzel mirror to test the condition of the nasal passages. He found that a large proportion of workers in hot, moist room (steam laundries) suffered from atrophic rhinitis. In passing from a normal or a cold room into a hot room there usually results an increase in colour, moisture and size of the inferior turbinates and of the nasal mucosa generally. Conversely, on going from a hot or normal room into a cold one there is a decrease. The second series of experiments were made to demonstrate

the effect of a current of air blown directly upon the face, *i. e.* to obtain information concerning the effects of draughts on the nasal mucosa. Most of the cases showed a reduction in size of the turbinates with decrease of secretion on passing from a normal room to a hot room in which electric fans were working. On going from a hot, dry room to a cold room in which a draught was created there was, on the other hand, an increase in the size and moisture of the nasal mucous membrane. As a result of his experiments Cocks comes to the conclusion that *the theory of bacterial infection as the sole cause of catarrhal inflammation of the upper air-passages is not tenable.*

J. S. Fraser.

### COLONEL HERBERT S. BIRKETT, C.B.

*Canadian Army Medical Service.*

His numerous friends in England were delighted to see Col. Herbert Birkett, of Montreal, at the last meeting of the Section of Laryngology of the Royal Society of Medicine of London. The President, Dr. Brown Kelly, welcomed him after his three years with the Army in France, and at a social gathering the same evening some forty oto-laryngologists collected to do him honour.

Dr. Birkett, after being in the Medical Service of the Canadian Militia for upwards of thirty years, was, at the outbreak of the Great War, a retired officer in the Reserve of seven years' standing; indeed, as far back as 1898 he put in a training at Aldershot, England. Although not personally affected by the mobilisation order, he nevertheless volunteered for active service, and was back in uniform within a few days of the momentous August 4, 1914. His services were at once directed to the organisation of the McGill Hospital unit, which was the first university hospital unit in the Empire to take the field. Early in 1915 he went as its Commandant to Boulogne, and there he has worked continuously until the state of his health compelled him to return to his own city.

The McGill Hospital at Boulogne contains 2100 beds; 87,000 patients have passed through it during Dr. Birkett's administration. The death-rate in that time has been 0.5 per cent., and the death-rate from operations (most of them major ones) has been 2.5 per cent. In securing this result Dr. Birkett has been fortunate in his staff of 32 doctors and 120 hospital-trained nurses. Both doctors and nurses have been what the French would call an *état-major d'élite*. The surgeon, the physician, and the pathologist left their professorial chairs in Montreal to do the work, and it is common knowledge that the result has been one of the show hospitals at the Front.

Needless to say, Dr. Birkett's name was well known before the war in Canada, where he has long been the leading laryngologist; in the United States, where he was a frequent and welcome visitor; and in England, where we have known him for many years. His talent for administration has been tested and developed while holding the office of Dean of the Medical Faculty of the McGill University, and it is owing to his health and the demands for his services in Montreal that he returns there, after an absence from his home of nearly three years.

We trust that the warmth of his welcome in passing through London will show how his services to the Empire are appreciated. We are proud to think that a laryngologist has so well filled these public duties, for Dr. Birkett is indeed a medical *officier de liaison* amongst the English-speaking peoples.

St Clair Thomson.

## OBITUARY.

WILLIAM LINCOLN BALLENGER, CHICAGO, U.S.A.

*Born December 26, 1861. Died December 22, 1915.*

THANKS chiefly to the invention of the ingenious swivel-knife, so generally used in resections of the septum, few names of American laryngologists are more frequently mentioned in our clinics than is that of our late colleague of Chicago. But his name will be known and will be remembered for other work. It was in the year 1899 that we first saw him over on this side, at the Sixth International Congress of Otology, and many of us can remember his youthful and vigorous appearance, his enthusiasm, and his charm. He had then, after some eight or nine years of useful general practice, devoted himself to otolaryngology and had just started in Chicago. The last time we saw him over here was at Liverpool, at the meeting of the British Medical Association in 1912. Then, his friends were equally struck with his aged and ill appearance. We did not know that he was already stricken with diabetes. Nevertheless, he continued in active practice until December, 1913, when he retired from Chicago to his country farm, where, after two years of suffering, he passed away.

Between these periods he had put in a full measure of strenuous life. He was an active member of many medical societies, including that select body, the American Laryngological Association. He was always one of the strong defenders of the recent innovation of complete enucleation of the tonsils. He was the author of two text-books, the first appearing in 1900, and the second and larger work on "Diseases of the Nose, Throat, and Ear," stood its ground for many years as one of the most important American text-books. Needless to say, that in his own country he was esteemed as a strong, able, and congenial colleague. No one was more popular during his visits to this country.

*StClair Thomson.*

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NOTES AND QUERIES.

On the recommendation of the Lord Provost, Dr. John McIntyre, Glasgow, has been appointed Deputy Lieutenant and a Justice of the Peace of the County of Glasgow.

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SUBSCRIPTION TO THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

The general rise in prices owing to the war has hitherto been met in the case of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY by the economies which the management have been able to effect in production, but in spite of all efforts the proprietors find themselves compelled to raise the annual subscription of the JOURNAL to 30s. (\$8), or to 3s. for each number.

The change is made with the consent of the Editorial Committee.

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BOOK RECEIVED.

**Otosclerosis.** By *Albert A. Gray, M.D., F.R.S.E.*, etc. London: H. K. Lewis & Co., Ltd. Price 12s. 6d. net.



THE  
JOURNAL OF LARYNGOLOGY,  
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## FIFTY CASES OF INNOCENT LARYNGEAL GROWTHS.

BY ANDREW WYLIE, M.D.,

Surgeon, Central London Throat and Ear Hospital.

WITH PATHOLOGICAL REPORT

BY WYATT WINGRAVE, M.D.,

Pathologist, Central London Throat and Ear Hospital.

WE do not try in this short paper on benign laryngeal growths to describe any special new phase or treatment, but merely to enumerate a series of cases removed "per vias naturales" by the indirect method of laryngoscopy, and to note particularly the site and nature of the growth, the method of removal or treatment, and subsequent history of result.

All cases of chronic inflammatory granulomata, such as tubercular and syphilitic growths, are rigidly excluded. Cases also which in the first instance were considered benign but ultimately developed into epithelioma, and where partial laryngectomy was performed, are not included.

Dr. Wyatt Wingrave adds a pathological report on forty-two of the cases. The remaining eight were not sent to him for examination; one was a child; one was treated by absolute rest; two were cured by operation to the nose and nasopharynx; and in four cases the growths were destroyed by the galvano-cautery.

According to the pathological report, we have divided the cases into four separate groups: Simple Papilloma, Fibro-Papilloma, Fibroma, and Sercedematous Growths.

### SIMPLE PAPILLOMATA.

CASE 1.—J. S —, aged thirty-eight. Male. Carman. Complained of hoarseness of two years' duration. Small growth on the posterior end of the left vocal



cord. Removed with MacKenzie's forceps. No recurrence. Pathologist reports: Squamous papilloma, with long slender fimbriae.

CASE 2.—A. S —, aged twenty-two. Male. Clerk. Complained of huskiness of three months' duration. Irregular growth on the anterior end of the left vocal cord. Removed with Grant's forceps. No recurrence. Pathologist reports: Fimbriated squamous papilloma.

CASE 3.—J. H —, aged fifty. Male. Signalman. Complained of hoarseness, intermittent in character, of two years' duration. Irregular growth on the

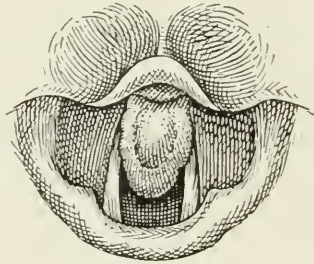


FIG. 1.—Case 7. Larynx showing large papilloma in anterior commissure.

We are indebted to Dr. Robert Broom and the late Dr. J. W. Lawson for kindly making these sketches of the larynx.

anterior end of the right vocal cord. Removed with Whistler's forceps. No recurrence. Pathologist reports: Sessile non-fimbriated squamous papilloma.

CASE 4.—R. G —, aged forty-seven. Male. Waiter. Complained of roughness of voice of six months' duration. A warty growth on the posterior end of the right vocal cord. Removed with the "universal" forceps. No recurrence. Pathologist reports: Deeply fimbriated or villous papilloma.

CASE 5.—A. E —, aged twenty-one. Female. Clerk. Complained of a tired feeling in her throat. Examination showed a small growth on the anterior end of



FIG. 2.—Case 7. Photograph of a large growth removed in two portions.

the left vocal cord. Removed with Whistler's forceps. No recurrence. Pathologist reports: Squamous papilloma, with short fimbriae.

CASE 6.—E. G —, aged thirty-seven. Female. Housewife. Complained of an irritable cough of many years' duration. A large growth on the middle-third of the left vocal cord. Removed with Grant's forceps. No recurrence. Pathologist reports: Echinoid squamous papilloma, surface studded with fine horny spines.

CASE 7.—S. B —, aged fifty. Female. Housewife. Complained of roughness of the voice and difficulty of breathing, especially when lying down, of twelve months' duration. A large growth hanging from anterior commissure seemed to

obstruct the whole lumen of the larynx (Fig. 1). Removed with MacKenzie's forceps in two parts as shown (Fig. 2). Two weeks later another piece was removed. Six months later a third piece was removed. First piece was squamous papilloma, second piece was fibroid tissue, and the last piece was a fibroma. No recurrence. Pathologist reports: Squamous papilloma, with scanty core and a few plasma cells.

CASE 8.—W. H. M—, aged forty-five. Male. Engineer. Complained of loss of voice at intervals for the last two years, especially after shouting. A small growth on the anterior end of the left vocal cord. Removed with "universal" forceps. No recurrence. Pathologist reports: Squamous papilloma with short sessile projections.

CASE 9.—H. B—, aged fifty-eight. Male. Fish hawk. Complained of hoarseness of several years' duration. Large growth on the posterior end of the left vocal cord. Removed with MacKenzie's forceps. No recurrence. Patient had a specific history and was under treatment. Pathologist reports: A sessile but echinoid squamous papilloma.

CASE 10.—M. S—, aged forty-two. Male. Clergyman. Complained of hoarseness on and off of four months' duration. A small growth on the middle third of the right vocal cord. Removed with MacKenzie's forceps. No recurrence. Pathologist reports: A villous papilloma with long fimbriae.

CASE 11.—L. S—, aged five. Female. A difference in character of the voice of several months' duration observed by the nurse. Several papillomata seen on both vocal cords. No operation for several months; but, as the child developed a

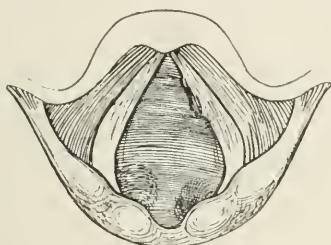


FIG. 3.—Case 12. Larynx showing growth (sessile) on anterior end of left vocal cord.

stridulous cough, chloroform was administered, Killian's tube was passed, and several of the largest growths removed with Patterson's forceps. The smaller growths disappeared. Pathologist reports: Villous papilloma (JOURN. OF LARYNGOL., RHINOL., AND OTOL., November, 1917).

CASE 12.—R. D—, aged thirty-five. Male. Hawker. Complained of roughness of voice of several years' duration. A ragged-looking growth (sessile in character) on the anterior end of the left vocal cord. Removed with the "universal" forceps (Fig. 3). No recurrence. Pathologist reports: A horny papilloma echinoid in appearance, with concentric "pearls" (see Fig. 12).

CASE 13.—J. C—, aged forty. Female. Dressmaker. Complained of difficulty in speaking, of one year's duration. Several growths seen on the right vocal cord and one on the left. Removed with MacKenzie's and Grant's forceps. Three months later again removed, but appeared in a month, and were destroyed, as far as possible, with the galvano-cautery. Once more returned, and caustics were applied at intervals, such as zinc chloride, salicylic acid, and sulphate of copper. Gradually the growths disappeared. Pathologist reports: Sessile papilloma, cores abundant. (Case shown Laryngological Society. "Transactions," 1911-12.)

CASE 14.—H. A—, aged twenty-six. Male. Clerk. Complained of roughness of voice of two years' duration. A rough ragged growth on the anterior end of the right vocal cord. Removed with Grant's forceps. No recurrence. Pathologist reports: Fimbriated papilloma.

CASE 15.—M. F—, aged thirty-five. Female. Complained of almost entire loss of voice of several months' duration. A considerable number of small growths on the posterior end of both vocal cords. Removed with the "universal" forceps at two sittings. No recurrence. Pathologist reports: Smooth sessile papilloma.

CASE 16.—S. J——, aged twenty-four. Female. Innkeeper. Complained of hoarseness of four years' duration. A round regular growth on the anterior end of the left vocal cord. Removed with Whistler's forceps. Six months later the growth returned, and was destroyed by the galvano-cautery. For several days there was sloughing of the cord at the site of the growth, which gradually dis-

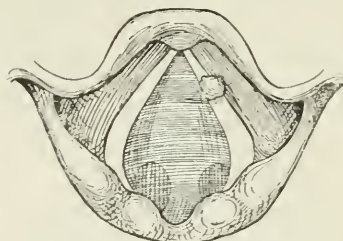


FIG. 4.—Case 16. Larynx showing round growth on anterior end of left vocal cord.

appeared. No recurrence. Pathologist reports: Sessile papilloma, with much plasma cells infiltration (Fig. 4).

CASE 17.—D. T——, aged fifty-two. Male. Engineer. Complained of hoarseness of several years' duration, especially when shouting. A large horny-looking papillomatous growth on the right vocal cord. Removed with Whistler's forceps. Pathologist reports: Keratin papilloma. Patient cannot be traced. (Case shown at the Laryngological Society. "Transactions," 1911-12.)

CASE 18.—F. D——, aged forty. Female. Housewife. Complained of hoarseness on and off, with at times complete loss of voice, of three years' duration. Multiple irregular growths—three on the right vocal cord, and one on the left. Removed several times with Grant's forceps at intervals of two weeks between each operation. The place where the growth was attached to the vocal cord was touched with the cautery. This caused a considerable amount of pain, œdema, and difficulty in breathing for ten days. No recurrence. Pathologist

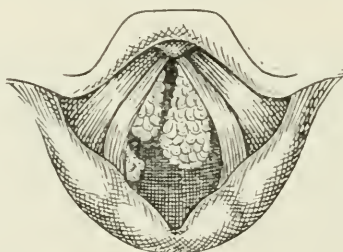


FIG. 5.—Case 18. Larynx showing four papillomata: three on the right vocal cord and one on the left.

reports: Squamous papillomata. (Case shown at the British Laryngological Society.) This patient had been treated before coming to the clinic for laryngeal phthisis, and had even undergone an open-air cure at a sanatorium with no result. She is now well (Fig. 5).

#### FIBRO-PAPILLOMATA.

CASE 19.—F. W——, aged forty. Male. Cabman. Complained of hoarseness of two years' duration. A large growth (subglottic) at the anterior commissure. Removed with the laryngeal snare. No recurrence. Pathologist reports: Fibro-papilloma. In this case there were also small papillomata hanging from the soft palate on each side of the uvula.

CASE 20.—A. S——, aged twenty-seven. Male. Painter. Complained of roughness of voice of several years' duration. A ragged-looking growth on the

middle-third of the left vocal cord, growing on the upper surface. Removed with the "universal" forceps. No recurrence. Pathologist reports: Fibro-papilloma.

CASE 21.—G. S.—, aged seventy-three. General in army. Complained of an irritating cough and roughness of voice. Small, round hard-looking growth on the middle-third of the left vocal cord. Removed with the "universal" forceps. Patient had considerable roughness and inflammation of the larynx for some weeks, which gradually disappeared. No recurrence. Pathologist reports: Fibro-papilloma.

CASE 22.—G. P.—, aged twenty-seven. Male. Clerk. Complained of roughness of voice of one year's duration. A smooth growth on the anterior end of the left vocal cord. Removed with Grant's forceps. No recurrence. Pathologist reports: Fibro-papilloma.

#### FIBROMATA.

CASE 23.—S. J.—, aged twenty-four. Female. Charwoman. Complained of a rough voice of four years' duration. An irregular growth on the posterior end of the left vocal cord. Removed with Whistler's forceps. No recurrence. Pathologist reports: Fibroma.

CASE 24. D. L.—, aged fifty-five. Male. Clerk, Law Courts. Complained of hoarseness of three months' duration. A pedunculated growth on the anterior end of the left vocal cord. Removed with Grant's forceps. No recurrence. Pathologist reports: Fibroma.

CASE 25.—W. S.—, aged thirty-two. Male. Porter. Complained of huskiness of six months' duration. A growth on the anterior end of the left vocal cord, partly subglottic. Removed with MacKenzie's forceps. No recurrence. There was a specific history in this case, and patient was put under treatment. Pathologist reports: Fibroma without any granulomatous infiltration.

CASE 26.—R. F.—, aged thirty-two. Male Milkman. Complained of roughness of voice of six months' duration. Sessile growth on the anterior end of the right vocal cord. Removed with MacKenzie's forceps. No recurrence. Pathologist reports: Fibroma.

CASE 27.—L. B.—, aged fifty-three. Female. Housewife. Complained of roughness of voice of several years' duration. A small sessile growth on the middle-third of the right vocal cord. Removed with MacKenzie's forceps. No recurrence. Pathologist reports: Fibroma.

CASE 28.—M. L.—, aged forty five. Male. Sea-Captain. Complained of a rough voice when at sea, and was not able to shout his orders; of several years' duration. A small, smooth growth on the anterior end of the right vocal cord. Removed with the "universal" forceps. No recurrence. Pathologist reports: Fibroma.

CASE 29.—Mrs. A.—, aged forty-two. Female. Housewife. Complained of slight discomfort in talking; of four months' duration. Two small growths on the right vocal cord, and one on the left, the latter at the posterior end. Removed at intervals of two weeks with MacKenzie's forceps. One removed each time. Patient was well for six months, when two of the growths returned. Again removed with MacKenzie's forceps, and the stump destroyed with the galvanocautery. No recurrence since. Pathologist reports: Fibroma.

CASE 30.—H. B.—, aged thirty-six. Male. Clergyman. Complained of sore throat after preaching, and at times his voice became indistinct. A nodule on the right vocal cord about the middle-third. Removed with MacKenzie's forceps. No recurrence. Patient preaching every Sunday since removal. Pathologist reports: Fibroma.

CASE 31.—F. W.—, aged twenty-one. Male. Carman. Complained of hoarseness of six months' duration. A small irregular growth on each vocal cord opposite each other. The surface appeared hard and horny, due to continual irritation. One growth was removed with Grant's forceps, the other by direct laryngoscopy. Pathologist reports: Keratinoids papillated fibroma. Patient cannot be traced.

CASE 32.—A. E.—, aged twenty-seven. Female. Shopassistant. Complained of hoarseness at times, with an alteration in the character of the voice. Small growth on the anterior end of the left vocal cord. Removed with the "universal" forceps. No recurrence. Pathologist reports: Fibroma (Fig 6.)

CASE 33.—A. S.—, aged twenty-two. Male. Ship's steward. Complained of huskiness of eight months' duration. There was marked obstruction in the nose



due to deviation of the septum. Small sessile growth on the middle-third of the left vocal cord. Removed with MacKenzie's forceps. The growth recurred and was removed with the "universal" forceps, and also a nasal resection performed. Pathologist reports: Fibroma. Patient cannot be traced.

CASE 34.—A. S—, aged forty-four. Male. Stockbroker. Complained of roughness of voice of two years' duration. On examination a small smooth growth was found hanging from the posterior end of the right vocal cord. The patient insisted on having a general anæsthetic, and the growth was removed by direct laryngoscopy (Bruning's). Pathologist reports: Fibroma.

CASE 35.—H. T—, aged forty-five. Male. Tailor. Complained of hoarseness of several years' duration. Large growth on the anterior end of the upper surface

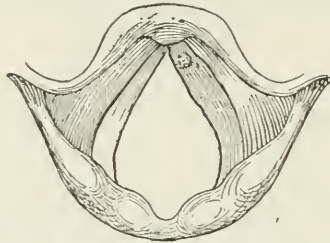


FIG. 6.—Case 32. Larynx showing small growth on anterior surface of the left vocal cord.

of the right vocal cord. Removed with MacKenzie's forceps. No recurrence. Pathologist reports: Fibroma.

CASE 36.—J. L—, aged thirty-five. Male. Fish hawk. Complained of hoarseness of several years' duration. Small round growth on the anterior end of the left vocal cord. Removed with the "universal" forceps. No recurrence. Pathologist reports: Fibroma.

#### SERCEDEMATOUS GROWTHS.

(Soft fibro-papillomata.)

CASE 37.—M. W—, aged twenty-seven. Female. Teacher. Complained of almost entire loss of voice of six months' duration. Small clear-looking growth on the middle-third of the left vocal cord. Removed with laryngeal snare. No recurrence. Pathologist reports: Sercedematous papilloma.

CASE 38.—R. T—, aged twenty-four. Female. Singer. Complained of roughness of voice of several months' duration. A very small excrescence growing from the edge of the left vocal cord at the posterior end, part of which was removed with Grant's forceps, but as there seemed to be a small thickening left, the galvano-cautery was used. The patient had œdema and swelling of the larynx for a week, but this gradually subsided. No recurrence. Pathologist reports: Sercedematous papilloma.

CASE 39.—I. C—, aged twenty-four. Female. Ladies' maid. Complained of hoarseness at intervals for four or five years. A small growth about the middle-third of the left vocal cord. Removed with Grant's forceps. Patient returned a year later with the same growth. Again removed with Grant's forceps, and the cautery was applied to the point of removal. There was a considerable amount of œdema, pain, and breathlessness for fourteen days, which gradually subsided. There has been no recurrence. Pathologist reports: Sercedematous fibroma.

CASE 40.—G. B—, aged thirty-nine. Male. Foreman works. Complained of slight bleeding from the nose of some months' duration, and general discomfort in breathing. A large pendulous growth (subglottic) from the middle-third of the left vocal cord. The growth hung down into the trachea, and was seen only at forced expiration. Removed with laryngeal snare. Epistaxis cured. No recurrence. Pathologist reports: Sercedematous growth.

CASE 41.—A. H—, aged twenty-seven. Male. Painter. Complained of hoarseness of two years' duration. A transparent polypoid-looking growth hang



ing from the anterior end of the left vocal cord. Removed with Grant's forceps. A small fragment remained, which was destroyed by the galvano-cautery a week later. There was considerable pain and dyspnœa for several days, which gradually subsided. Later on, a slight recurrence of the growth called for another application of the cautery, which destroyed it. Pathologist reports: Serœdematous papilloma (Fig. 7), (*Lancet*, November, 1907).

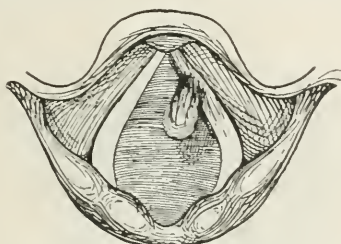


FIG. 7.—Case 41. Larynx showing polypoid growth hanging from anterior end of left vocal cord.

CASE 42.—A. H——, aged twenty-two. Male. Joiner. Complained of huskiness of six months' duration. A vascular-looking growth on the middle third of the left vocal cord. Removed with Grant's forceps, and two days later stump destroyed with the galvano-cautery. No recurrence. Pathologist reports: Serœdematous angioma.

#### UNCLASSIFIED GROWTHS.

CASE 43 —W. P——, aged fifty-two. Male. Miller. Complained of loss of voice at times and difficulty in breathing of two years' duration. A grey, ragged-



FIG. 8.—Case 43. Larynx showing a ragged-looking growth on anterior commissure.

looking growth at the anterior commissure attached to the end of the left vocal cord. The growth was destroyed by two applications of the galvano-cautery. No recurrence. Case shown at the British Laryngological Society, March, 1905 (Fig. 8).

CASE 44.—P. S——, aged forty-five. Female. Teacher. Complained of roughness of the voice of six months' duration. A vascular growth on the upper surface of the anterior end of the right vocal cord. Destroyed by the galvano-cautery. No recurrence.

CASE 45.—E. T——, aged twenty-two. Female. Singer. Complained of a tired feeling and not able to sing. A small nodule on the middle-third of the right vocal cord. Cured by prolonged rest to the voice. No recurrence.

CASE 46.—D. L——, aged twenty. Female. Singer. Complained of a thickness of the voice of six weeks' duration. A sessile growth resembling a papilloma on the upper surface of the anterior end of the left vocal cord. Destroyed by the galvano-cautery and rest to the voice for several months. No recurrence (Fig. 9).

CASE 47.—G. D——, aged twenty-five. Male. Composer. Complained of a tired feeling after talking in a noisy room of several months' duration. Small nodule on both vocal cords. Marked deviation of the septum with swelling of the anterior end of the right inferior turbinal. Cured by an operation to the nose to ensure free nasal respiration, and a prolonged rest to the voice.

CASE 48.—F. T——, aged twenty-eight. Female. Singer. Complained of a tired feeling, and not able to sing. A small nodule on the middle-third of the left vocal cord, with swelling of the anterior ends of both inferior turbinals. Cured by an operation to the nose. No recurrence.

CASE 49.—H. A——, aged four. Male. Several small growths on the right vocal cord. Could only be examined under an anæsthetic. No operation performed. Child seen two years later; the growths had disappeared.



FIG. 9.—Case 46. Larynx showing small growth (sessile) on left vocal cord.

CASE 50.—D. T——, aged twenty-nine. Female. Singer. Complained of a tired feeling and not able to use her voice. A large nodule on the right vocal cord about the middle-third. Destroyed by the galvano-cautery. No recurrence.

(To be continued.)

## PRIMARY TUBERCULOSIS OF THE FAUCIAL TONSILS IN CHILDREN.

BY A. PHILP MITCHELL, Ch.M., M.D., F.R.C.S.,  
Interim Surgeon, Royal Hospital for Sick Children, Edinburgh.

(Report to the National Medical Research Committee.)

From the Royal College of Physicians' Laboratory, Edinburgh.

(Continued from p. 15.)

### Experimental Results.

In proceeding to record the results of the experimental side of the investigation, I desire in the first place to point out how very small is the number of cases in which hitherto tubercle bacilli have been obtained from a tonsil and cultivated, and the type of bacillus determined. The only instances of which I know are three cases reported by Brown and Smith (1907<sup>7</sup>), and one case by Hess (1908<sup>18</sup>).

Of the cases investigated by Brown and Smith all were due to the bovine bacillus. The ages were two, five, five. The patient had in each instance tuberculosis of the cervical glands. The single case studied by Hess was a girl, aged six, with a negative family history. She was a pale, thin child, with a poorly-developed chest. The tonsils were hypertrophied; microscopically they showed no evidence of tuberculosis. Clinical examination of the chest disclosed no changes in the lungs, but a radiograph showed a well-defined infiltration of a tuberculous character around the roots of the lungs, more marked on the right side. There was slight enlargement of the cervical lymph nodes, this probably being of a toxic non-tuberculous nature. The faucial tonsils yielded the bovine type of tubercle bacillus.

The experimental results of the present investigation are as follows:

In Group A the inoculation test was employed in ninety-two of the 106 cases investigated (Table III). Positive results were obtained in twenty cases (21 per cent.), the bovine bacillus being present in sixteen cases and the human in four cases.

TABLE III.—*Examination of Faucial Tonsils (Group A) to determine Type of Tubercle Bacillus.*

No. and Initial.	Age in Years.	Microscopic Examination.	Result of Inoculation.	Family History of Tuberculosis.	Type of Bacillus.
1. J. M'B.	10	—	+		Bovine.
2. M. G.	3½	+	+	Father has pulmonary tuberculosis	Human.
3. B. P.	9½	+	+	Brother, aged five, has had several tuberculous cervical abscesses. Sister had tuberculous cervical adenitis as a child and died in adolescence from generalised tuberculosis	Bovine.
4. G. L.	8¾	+	+	...	"
5. J. W.	12	+	Septic infection	...	...
7. B. L.	4	+	"	...	...
8. W. B.	10	—	+	Sister, aged six, died from tuberculous meningitis, one month after patient's cervical glands were excised	Bovine.
12. A. W.	4	+	Septic infection	...	...
14. M. B.	7¾	+	+	...	Bovine.
15. W. M.	30	+	Septic infection	...	...
16. J. A.	10	+	"	...	...
18. W. L.	5	—	+	...	Human.
19. D. B.	8	+	Septic infection	...	...
20. A. C.	17	+	+	...	Human.
21. L. S.	3½	+	+	...	Bovine.
24. T. C.	4	+	Septic infection	Bovine type of tubercle bacillus isolated from hypertrophied tonsils removed from patient's sister ( <i>vide</i> No. 7, E. C., Table IV)	...
25. R. A.	1¾	+	+	...	Bovine
31. J. I.	3½	—	+	...	"
36. J. F.	3	—	+	...	"
37. J. S.	8	+	+	...	"
39. M. S.	9	+	Septic infection	...	...
40. G. T.	4	+	"	...	...
42. C. C.	5½	+	No inoculation	...	...
43. J. M.	18	+	Septic infection	...	...
47. M. M.	10	+	+	...	Bovine.
48. C. W.	2	—	+	Brother, aged eight, died from tuberculous meningitis	"
50. R. C.	2½	+	+	...	"
51. R. G.	5	+	+	Brother, aged seven, has tuberculous disease of humerus	"

No. and Initial.	Age in Years.	Microscopic Examination.	Result of Inoculation.	Family History of Tuberculosis.	Type of Bacillus.
53. H. L. .	4	+	Septic infection	...	...
61. N. L. .	6	+	+	...	Human.
65. C. A. .	6	+	+	Sister, aged nine, also developed tuberculous submaxillary glands	Bovine.
66. M. M. .	12	+	Septic infection	...	...
67. M. M. .	4 $\frac{3}{4}$	+	"	...	...
73. K. A. .	7	+	+	...	Bovine.
75. D. W. .	6	+	No inoculation	...	...
76. D. W. .	9	+	"	...	...
82. A. M'M.	8	+	"	...	...
83. L. S. .	4 $\frac{1}{2}$	+	"	...	...
84. C. R. .	7	+	"	Sister died in infancy from tuberculous meningitis	...
85. H. M'D.	1 $\frac{1}{2}$	+	"	...	...
86. I. H. .	4	+	"	Sister, aged six, died from generalised tuberculosis	...
88. D. R. .	1 $\frac{6}{12}$	+	"	...	...
90. I. C. .	3	+	"	...	...
92. R. M'W.	1 $\frac{7}{12}$	+	"	...	...
93. M. D. .	6	+	"	...	...
95. J. C. .	3	+	"	...	...
97. J. M'L.	5	+	"	...	...

+ signifies detection of tuberculosis.

Of the hundred children in Group B (see Table IV) from whom the faucial tonsils were removed for chronic hypertrophy, nine (9 per cent.) of the cases yielded positive results when inoculated into guinea-pigs. The bovine bacillus was present in four cases and the human in two cases. In the remaining three cases the type of bacillus was not determined owing to the contamination of the culture tubes.

It should be noted that in the inoculation test the percentage of lesions found was markedly lower than that obtained by microscopical examination of the tonsils. This is explained by the fact that a large number of inoculated guinea-pigs die from rapid septic infection before tuberculous changes have had time to develop.

A correct interpretation of the bacteriological findings is impossible without specially considering the sources of infection in the cases under review.

At the outset it may be concluded from these experimental results that tonsillar tuberculosis of bovine origin is prevalent amongst children in Edinburgh and district. This bacteriological finding was to be expected, in view of the frequent occurrence of the bovine type of tubercle bacillus in the upper deep cervical lymph glands of children, with which glands the lymphatic drainage of the faucial tonsils is so closely related. Further, it is reasonable to suppose that the milk supply of the same area is often infected with bovine tubercle bacilli. That this is really the case will appear from the following direct evidence. Recently I carried through an inquiry as to the prevalence of tubercle bacilli in the Edinburgh milk supply, particularly that portion

TABLE IV.—*Examination of Hypertrophied Fauical Tonsils (Group B) to determine Type of Tubercle Bacillus.*

No. and Initial.	Age in Years.	Microscopic Examination.	Result of Inoculation.	Family History of Tuberculosis.	Type of Bacillus.
1. M. M. .	6	+	+ Contamination of culture tubes	...	...
2. M. L. .	10	+	+	Brother, aged three and a half, had tuberculous cervical glands, from which bovine type of tubercle bacillus was isolated	Bovine.
3. E. M. .	9	—	+	...	Human.
4. R. M'L.	5	+	+	...	...
			Contamination of culture tubes		
5. N. S. .	6	+	+	Sister, aged three and a half, died from tuberculous meningitis.	Bovine.
7. E. C. .	2 $\frac{3}{4}$	—	+	Brother, aged four, had tuberculous cervical glands, from which bovine bacillus was isolated	„
8. A. M'C.	4	+	+	...	...
			Contamination of culture tubes		
9. T. E. .	8	—	+	Father died of pulmonary tuberculosis	Human.
10. A. B. .	6	+	—	...	...
11. A. B. .	6	+	Septic infection	...	...
12. J. B. .	6 $\frac{1}{2}$	+	„	Brother, aged three, died from tuberculous meningitis	...
13. J. C. .	7	+	No inoculation	...	...
14. M. S. .	11	All tissue inoculated	+	...	Bovine.

+ signifies detection of tuberculosis.

derived from country districts. The results of this investigation showed that of 406 samples of mixed milk collected from the same number of milk shops, eighty-two samples (20 per cent.) contained tubercle bacilli. Children being large consumers of milk, and milk, according to some, forming such an essential part of their diet, it is quite clear how contaminated milk may be to them a frequent source of infection. Small as is the danger in individual cases the multiplicity of opportunities gives it considerable importance for children. In this connection it must also be mentioned that of the eighty-five cases under five years of age seventy-seven, or 90 per cent., were bottle-fed babies. Moreover, it is a noteworthy fact that in Scotland it is the exception and not the rule to sterilise cow's milk. While the faucial tonsils and the cervical lymph



glands must often succeed in killing the small numbers of tubercle bacilli, which are frequently present in unsterilised milk, they fail to cope with such large amounts as are ingested by children who are unfortunately being nourished with milk from a single cow with tuberculosis of the udder, or from a small herd harbouring a cow with either tuberculosis of the udder or with advanced clinical tuberculosis. Furthermore, it may be confidently stated that the reason why many children do not present any clinical evidence of tuberculosis, in spite of the fact that they are frequently drinking infected milk, is to be found in a consideration of the results of certain experiments. These have shown that while inhalation of tubercle bacilli is a certain method of infection, even when small doses of bacilli are employed, very much larger doses of bacilli are required to produce the disease by way of the alimentary canal. It is perfectly plain, therefore, that when the milk is obtained from a single cow with udder tuberculosis or with advanced generalised tuberculosis, or from the mixed milk from a small herd containing one or more tuberculous cows, a child may receive the infection in concentrated form.

Whenever a child lives in close contact with tuberculous parents or relatives it is easy to understand how readily inhalation of human tubercle bacilli, conveyed by dried sputum or the moist spray from the coughing of a consumptive patient, may occur. The relationship of this source of infection to the cases under consideration is recorded in Tables III and IV. Amongst children with tuberculous cervical glands this source of infection appears, however, to be very frequently absent. Such children are born in many instances of non-tuberculous parents. In this connection it may also be noted that in not a single case of bovine tonsillar tuberculosis was there a history of pulmonary tuberculosis in other members of the household. In twelve cases, however, one or more of the children in the respective families were, or had been, affected with other forms of tuberculosis. Lastly, clinical examination of the chest failed to reveal evidence of pulmonary tuberculosis in any of the children or adults whose tonsils have been investigated.

#### *Pathological Considerations.*

It must first be stated how much one is struck with the numerous instances of tuberculous cervical glands met with in the large number of cases coming for examination at the surgical Out-Patient Department of the Edinburgh Royal Hospital for Sick Children. Out of 3166 new cases treated in the surgical Out-Patient Department during 1915, 224 children, or fully 7 per cent., required operative measures or treatment by tuberculin for tuberculosis of the cervical glands. These children otherwise had no obvious signs of tuberculosis, and were, except for the local condition, apparently healthy. With such frequent localisation of the disease in well-defined lymphatic groups it was natural to consider it as a first stage in the spread of tuberculosis, and also to inquire as to the sources and channels of infection of the glands. The sources of infection have already been considered; it only remains for us to discuss the latter.

If we are to understand clearly the pathway of infection, it is essential to refer shortly to the arrangement of the lymphatic glands in the neck. The cervical glands are divided into two main groups—

the superficial, forming a kind of circle at the junction of the head and neck, and the deep, consisting of a right and left vertical chain under the sterno-mastoid. For anatomical and pathological reasons it is convenient to divide the deep cervical chain into several subsidiary groups. The chain may be first divided into an upper and lower portion, the former situated above the level of the anterior belly of the omohyoid muscle and the latter below it. Each of these divisions is again subdivided into an anterior and a posterior chain. It is the upper group of glands that concerns us most, as, in the majority of cases of tuberculous cervical adenitis in children, these are the first involved by the tuberculous process. This is explained by the fact that this group receives its lymphatic drainage from the pharynx and nasopharynx, including the faucial and pharyngeal tonsils, the former of which I have shown to be not only frequent portals of entry for the tubercle bacillus, but in a great many instances to exhibit microscopic evidence of having been involved by the tuberculous process. The upper anterior group is the most important, from the fact that in the great majority of cases of tuberculous cervical adenitis in children these glands are more frequently affected than any other, and they are also the first involved by the tuberculous process. This is particularly true of one large gland constantly found in the angle formed by the junction of the common facial and internal jugular veins beneath the posterior belly of the digastric, and named by Wood the tonsillar lymph gland, since he succeeded in tracing the efferents of the tonsils into this gland. In eighty of the 106 cases under consideration the tonsillar lymphatic gland gave at operation evidence of the most advanced tuberculous change. In the remaining twenty-six cases the upper anterior and posterior groups of glands were equally involved by the tuberculous process.

Here the question might be raised—How early may one suppose that tuberculosis develops in the cervical glands after disease has originated in the faucial tonsils? It is quite impossible to fix a definite period, as many factors come into play—the quantity of infective agent, its virulence, and the power of resistance in the body. This leads up to still another question—What happens after the infection has reached the tonsillar lymph gland? It frequently happens in children that the tuberculous process is limited to this node, and recovered from without the involvement of other groups of glands, or the disease remains latent until adult life, when a tuberculous abscess appears insidiously in the region of the tonsillar gland. In a few cases the tonsillar gland overcomes the infection, while glands lower in the chain, especially those surrounding the spinal accessory nerve, may caseate and form an abscess which points at the posterior border of the sterno-mastoid. In other cases the disease gradually descends from node to node until the whole chain of deep glands is affected. It is beyond the scope of the present paper to consider more closely the spread of tuberculosis beyond the neck by the lymphatic system.

Considering the microscopic appearances of the tonsils (Groups A and B) there is little room for doubting the correctness of the view that infection has been a direct one from the mouth. Although it cannot be said that the disease affects any portion of the tonsil exclusively, it must be admitted that there is a tendency for it to begin in the region of the crypts, immediately under the surface epithelium as if from a direct spread from the stagnant and infected food lying in their interior,

the remainder of the tonsil being comparatively free. The view held by Kingsford (1904<sup>23</sup>) that it is a blood infection cannot be accepted, nor that of von Recklinghausen (see Carmichael, 1910<sup>8</sup>) that it is due to backward infection from the lymph glands. However, it is true that, although the deepest parts of the tonsils are not infrequently affected, the crypts in many instances extend to the bed of the tonsil and render the organ most accessible to a mouth infection. Again, the frequent occurrence of tuberculous lesions, immediately under the surface epithelium, does not lend support to Schlesinger's view (1896<sup>38</sup>) that it is an external infection rather than an infection from the mouth. Dieulafoy (1895<sup>11</sup>), Orth (1879<sup>30</sup>), Baumgarten (1890<sup>5</sup>), and others also believe from the results of many experiments that a frequent mode of infection of the tonsils is by ingestion. This evidence, in conjunction with the anatomical arrangement of the lymphatics and the absence of signs of pulmonary tuberculosis in the respective cases, seems to me sufficient proof of the tonsils being primarily affected and of their having been the cause of a secondary infection of the cervical glands. In short, the probability of a sputum infection of the tonsils, the primary focus being in the lungs, may be dismissed, in the case of children at any rate. Granting this, it may then be assumed with certainty that the operative treatment of tuberculosis of the upper deep cervical glands is incomplete without removal of the faucial tonsils.

Tonsillectomy may be performed either before or after the operation for removal of the tuberculous cervical glands. It is advisable to deal with the glands first, in all cases where the disease is advancing rapidly and complicated by abscess formation. The importance of removing the tonsils entire in their capsule need scarcely be mentioned. After removal of the tonsils the tuberculous neck glands may subside more or less though not always permanently, or continue to enlarge. However, I have noticed a remarkable improvement in the general health of children, following the extirpation of tonsils which proved to be tuberculous.

In closing, I desire to call attention to the beneficial effect of removing hypertrophied faucial tonsils complicated by considerable toxic enlargement of the tonsillar lymphatic glands. Tonsillectomy in such cases invariably results in complete disappearance of the enlarged tonsillar glands, which otherwise would be a suitable nidus for the tubercle bacillus.

#### CONCLUSIONS.

The conclusions which I think are warranted by the present investigation upon primary tuberculosis of the faucial tonsils may be stated as follows:

(1) Tuberculosis of the upper deep cervical glands develops from a primary focus in the faucial tonsils much more frequently than is generally supposed.

(2) Primary tuberculosis of the faucial tonsils can be recognised only by the aid of the microscope and by inoculation experiments. The lesions are found in certain localities, namely, immediately under the surface epithelium and near the mouth of the lacunæ, in relation to the deeper portions of crypts, or deep in the tonsil close to the capsule. The first-mentioned site supplied the greatest number of examples.

(3) Hypertrophied faucial tonsils are the seat of primary tuber-

culosis, though rarely as compared with tonsils from cases of tuberculous cervical adenitis.

(4) The experimental results indicate that in Scotland, at any rate, primary tuberculosis of the faucial tonsils in children must be attributed to the drinking of milk from tuberculous cows, rather than to the inhalation of human tubercle bacilli conveyed by dried sputum or the moist spray from the coughing of a consumptive patient.

(5) Bovine and human types of tubercle bacilli are present in the tonsillar crypts of a small percentage of children without demonstrable tuberculous lesions either in the tonsils or elsewhere.

(6) Tonsillectomy is essential in all cases of tuberculous cervical adenitis in children.

(7) The prognosis is very slightly influenced in children in whom the faucial tonsils and cervical glands are simultaneously affected with tuberculosis.

(8) The difficulties associated with the reform of the milk supply and the lengthened period which must elapse before it becomes possible to obtain a tubercle free milk demand some means of rendering milk safe. The only immediate safeguard is to be had in the sterilisation by boiling of milk for the artificial feeding of infants and the nourishment of all children.

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## DESCRIPTION OF PLATES.

## PLATE I.

FIG. 1.—Tubercle follicles and giant cells immediately under surface mucosa round the mouth of a crypt in supratonsillar fossa. There is early caseation. Localised infection of tonsil. Case 2, M. G — (Group A). × 45.

FIG. 2.—Tubercles show as light areas in some of which giant cells are present. Generalised infection of both tonsils. Case 5, J. W — (Group A). × 45.

FIG. 3.—Many giant cell systems scattered throughout the tonsil, the germinal centres having disappeared in many places. Case 14, M. B — (Group A). × 75.

FIG. 4.—Diffuse infection of tonsil. Tubercles and giant cells are shown under the surface mucosa. Caseation is marked. Case 16, J. A — (Group A). × 45.

FIG. 5.—Tubercle follicles and giant cells round the sides and bottom of a crypt which is cut longitudinally and contains tuberculous granulation tissue. Case 21, L. S — (Group A). × 45.

FIG. 6.—Section similar to Fig. 5, showing the same crypt cut transversely. Central caseation is beginning in some of the follicles. Case 21, L. S —. × 45.

## PLATE II.

FIG. 7.—Section of tonsil showing the histology of the tubercle. Large and small giant cells are to be seen. Case 37, J. S — (Group A). × 200.

FIG. 8.—Section of tonsil showing tubercle follicles and giant cells close to capsule. Case 48, C. W — (Group A). × 75.

FIG. 9.—Many tubercle follicles and giant cells immediately under surface mucosa. Case 51, R. G — (Group A). × 45.

FIG. 10.—Tonsil was freely studded with tubercle follicles and giant cells. Caseation was a marked feature. Section showing tubercle follicle with well-marked central caseation and several giant cells. Case 61, N. L — (Group A). × 60.

FIG. 11.—Section of hypertrophied tonsil showing giant cell close to wall of crypt. Case 11, A. B — (Group B). × 200.

FIG. 12.—Numerous tubercles and giant cells round the mouth of main crypt, the lining of which is completely destroyed. Some of the tubercles show early caseation. Case 4, G. L — (Group A). × 45.



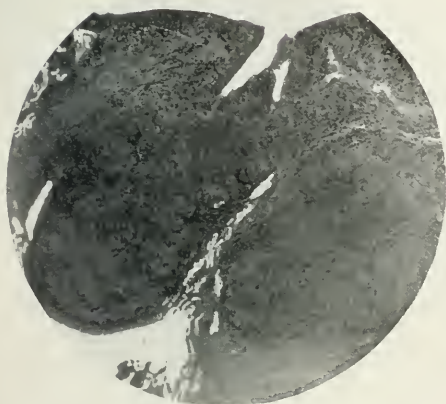


FIG. 1.

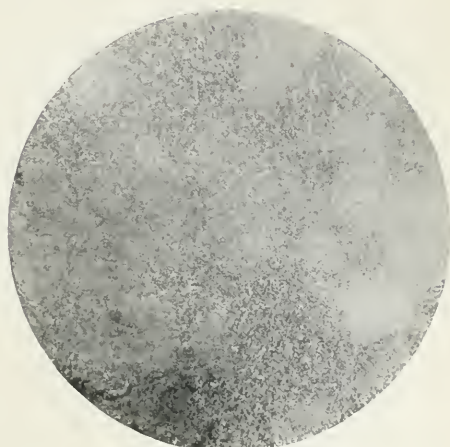


FIG. 2.

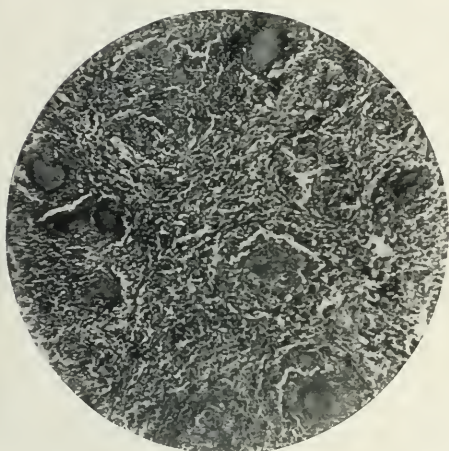


FIG. 3.

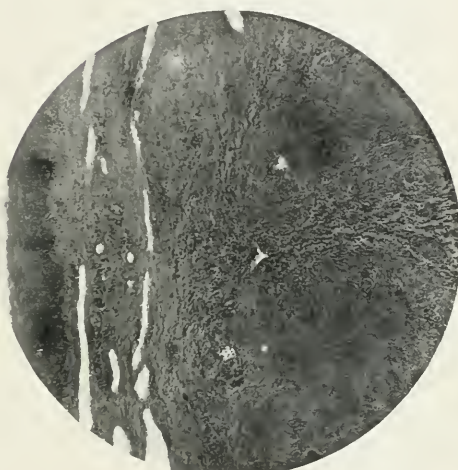


FIG. 4.



FIG. 5.



FIG. 6.

TO ILLUSTRATE DR. A. PHILP MITCHELL'S ARTICLE ON PRIMARY TUBERCULOSIS OF THE FAUCIAL TONSILS IN CHILDREN.



## ATRESIA OF THE CHOANÆ: A SIMPLE DEVICE FOR PREVENTION OF RE-FORMATION OF THE OBSTRUCTION AFTER ITS REMOVAL.

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CONGENITAL atresia of the posterior choanæ may be unilateral, bilateral, partial, or complete. It may be caused by a completely bony, or a bony membranous structure.

That cases of this congenital malformation seldom come under our observation may be accounted for by asphyxia neonatorum being not infrequently due to this cause, as has been stated by Charles W. Richardson, so that only a few survivors seek our aid.

The dramatic description which a mother gave of the struggle of her infant daughter for breath shortly after birth showed how the combat might have ended otherwise. With blue face and tongue protruding from the mouth, the infant was rushed to the nearest hospital. Respiration was restored somehow. I first saw this child in May, 1908, when she was eight and a half years old.

She had complete bony atresia of both choanæ. Under general anæsthesia, with a hand burr and sphenoidal sinus punch the partition was removed as thoroughly as possible. The head was in Rose's position. The index finger of the left hand in the nasopharynx made a reliable guide for the instruments. A month after the operation the child could blow through both nostrils, but she would not allow any examination of the nose, so after-treatment to keep the obstruction from re-forming was impossible. She did not report to me again till March, 1917. Her nose was again completely obstructed—the membrane had re-formed; openings about the diameter of a crow's quill existed, through which she could not blow the nose, much less respire. In April, 1917, under open ether the partitions were again removed. A long folded strip of bismuth gauze about three-quarters of an inch wide was passed down one nostril till it was felt with the index finger in the nasopharynx. A nasal dressing forceps was then passed down the other nostril till it caught the end of the gauze strip, which was then drawn up through the nostril, and the two ends of the gauze tied together across the columella. The loop of gauze around the posterior margin of the septum was drawn forward in adjusting the knot so that it was in close contact with the septal margin. Daily the nurse undid the knot, sewed a fresh strip of gauze to one end of the strip in the nose, and by drawing on the opposite end of the nasal strip a fresh one took its place, and was tied as before. This was kept up for two weeks, when the dressing was finally removed. As the bismuth gauze does not adhere to the tissues no pain was caused by changing the dressing. It has the further advantage that it remains sweet and free from decomposition. The gauze ought to be thick and well impregnated with the bismuth salt. The bismuth gauze which I have used for the past ten years as a dressing after submucous resection of the septum and other intranasal operations was originally designed as a dressing for burns. I find it most satisfactory, and many of my colleagues have adopted it for intranasal packing after operations.

At the date of the second operation the patient, aged sixteen and a half, had self-control, and allowed the nose to be examined once a week after the dressing had been removed for seven weeks. A weak solution of cocaine and adrenalin hydrochl. contracted the intranasal tissues so that one could look through the choanal openings, into which, at each sitting, a forceps was introduced and expanded to prevent contraction. When treatment was left off the margins of the choanal openings were quite healed, re-closure was impossible, and nasal breathing free.

Seven weeks later a girl, aged sixteen, came with a similar condition. A general surgeon had operated ten years previously: no relief. Obstruction was bilateral, partly bone, partly membrane. Treatment same as in the first case. Result—free nasal breathing; choanal margins healed. Retention with renewal of the dressings for two weeks may not be found long enough in every case, but if the process needs to be continued for a much longer period it is quite safe, and causes but slight inconvenience. This method of dressing ought to be applicable to other intranasal operations to prevent re-formation of adhesions in opposing surfaces.

In congenital closure of the choana the Symonds' method of the removal of a portion of the posterior septum to prevent re-formation of the membrane ought to be successful if enough septum is removed.

Watson-Williams (*Rhinology*, 1910) knows of no way of preventing re-closure unless the corresponding portion of the nasal septum is removed.

Sir StClair Thomson, in his excellent work on diseases of the nose and throat (second edition), recommends removal of a portion of the septum as a part of the operation. Even when this is done, as may be advisable, to make sure of a permanent result, I believe that the bismuth gauze loop will be a useful dressing. It would certainly help to check hæmorrhage after the operation. I am satisfied that in two cases the gauze loop dressing secured a permanent opening without removal of a portion of the nasal septum.

## OSSICULECTOMY IN CHRONIC ADHESIVE OTITIS.

By A. J. BRADY,

Hon. Consulting Surgeon, Sydney Hospital, N.S.W., Department for Diseases of the Ear, Nose and Throat.

A PAPER read by Dr. J. Watson-Williams at a meeting of the Royal Society of Medicine, November 17, 1916, and the discussion on the same prompts me to write these few notes. All of those who discussed the paper held the view, based on their experience, that improvement of hearing from this procedure is always only temporary. If one has had a different experience, even in one case carefully observed, it is worth recording for the guidance of others. The few cases on which I have operated were not operated on with the view of improving the hearing, which in these was a secondary consideration. I have a record of only three cases; they were each done in an attempt to relieve incessant and intolerable tinnitus aurium in which various other methods of treatment failed to afford relief. In each of these



cases the appearance of the drum membrane and the position of the ossicles led one to believe that the contraction of adhesive bands was drawing the ossicles inwards, and exercising pressure on the intralabyrinthine fluid. The first case was operated on over twenty years ago—a nun, aged twenty-five. She suffered from constant tinnitus in the left ear, which prevented sleep, and was breaking down her health. The hearing in this ear was also very dull. The right ear was affected to a less extent. The hearing was slightly dull, but tinnitus was distressing in left ear only, in which the membrana tympani was very opaque, thickened, and indrawn, and without light-reflex. Various treatments, local and general, were without avail. As a last resource the drum membrane, malleus and incus were excised. Relief of the tinnitus followed. Immediate improvement of hearing was not noted at the time, as the right ear was then relied upon, but when the left ear was tested some months later, a decided improvement was found in the hearing, both for watch and speech tests. In after years, at intervals, I have seen this case. The right ear became gradually deaf, and now, 1917, is useless. The left ear, operated on over twenty years ago for the relief of tinnitus, is quite useful. She can hear conversation in this ear in ordinary tones, and she carries on her daily life without trouble—tinnitus is not complained of. The middle ear is completely epidermised, dry and clean.

The second case was a man, hospital out-patient, with distressing tinnitus left ear. Right, normal; unable to follow his occupation of seaman. Left membrana tympani, very much indrawn. Left ear, very dull hearing. No relief from local and general treatment of usual sort. In first instance, the membrane was incised and tensor tympani divided with temporary relief. Complete relief of tinnitus, hearing for tests almost equal to good ear; patient resumed his occupation, and not seen again, so this case is useless, as an example of permanent improvement.

Case three, a very neurotic woman, hospital out-patient, a visitant of many clinics. Her complaint was distressing tinnitus aurium. Membrana tympani greatly altered. Old dry perforations, with much-thickened remains of drum membranes. Remains of drum membrane and ossicles excised in worse ear. No improvement. Here the local changes indicated a suitable case with hope of improvement.

The one clear case recorded, with well maintained and permanent improvement, shows that the experience of those who discussed Dr. Watson-Williams' paper is not universal, and that their pessimism, which has no hope for a permanent result in any case however well selected, is not justified.

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## DEAFNESS DUE TO THE PLACING OF CANDLE GREASE IN THE EXTERNAL AUDITORY MEATUS.

By G. E. W. HENDERSON, L.R.C.P. & S.(EDIN.),

Late Clinical Assistant, Ear, Nose, and Throat Department, Royal Infirmary, Edinburgh.

THE following case is interesting as showing what harm may be done through the agency of the lay Press in offering its readers hints on matters pertaining to health.



Mrs. A—— came to me recently complaining of complete deafness in the left ear. She stated that the deafness had come on quite suddenly. She gave no history of previous ear trouble. On examination the tuning-fork tests all pointed to a complete middle-ear deafness on the left side. On examining with the speculum I was struck by the fact that I could make out no details of the drum-head; it appeared very opaque, and there was no cone of light. I was unable to define Shrapnell's membrane. The appearance gave one the impression that there must be a catarrhal exudate in the middle ear.

A Eustachian catheter was passed, but on inflation air entered easily, and there was no moist sound.

After another careful examination through the speculum I detected what appeared to be a slight bulge outwards about the centre of the membrane.

On closely questioning the patient as to whether she had ever put anything into her ear, she informed me that she had recently been in London, and had been unable to sleep on account of the street noises outside her hotel window. Having read in a newspaper that ordinary candle grease moulded into a cone and placed in the ear made an excellent noise deadener, she had tried it. In the morning she thought the cone in the left ear had dropped out as it was not in the ear. She also stated that the weather at the time was exceedingly hot. It was now a simple matter to arrive at the diagnosis. The grease had melted and moulded itself in a thin layer completely over the membrane. To get it out presented to my mind some difficulty. Syringing with a warm alkaline solution failed completely, so I advised her to go home and have a warm solution of sodium bicarbonate in glycerine dropped into the ear several times daily for two or three days. She did this, but on her return to me there was no alteration, and after repeated syringing I came to the conclusion that as heat had been the cause of the trouble it might be used as the remedy.

I suggested that, as she was unable at the time to go from home, and as electric light was not obtainable at home, she should try lying with her ear on an ordinary rubber hot-water bottle containing very hot water. I directed her to make a "bird's nest" of cotton-wool to place round the ear in order to protect the skin from being burnt. Next day she returned for further examination. The bulge was more pronounced, and I was able to make out Shrapnell's membrane. I syringed the ear, trying to direct the stream towards the upper part of Shrapnell, and in a few minutes the wax came out. It was a small piece, and had been so closely moulded to the drum-head that the depression made by the umbo was clearly defined.

An interesting point in the case was the extraordinary resemblance the wax bore to the appearance of the drum-head in a case of catarrhal exudate in the middle ear, I confess I was completely misled at the start.

## SOCIETIES' PROCEEDINGS.

### ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

H. J. MARRIAGE, *President of the Section, in the Chair.*

MEETING on War Injuries and Neuroses of Otological Interest. For introductory papers, *see JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY*, June, 1917, p. 177, by H. J. Marriage, and November and December, 1917, pp. 340 and 369, by J. S. Fraser and Capt. J. Fraser.

Colonel BIRKETT, C.B.

I cannot offer any suggestions on the discussion which has been opened by yourself, but I think that perhaps Dr. Gordon Wilson, who has been making a special study of this work, may have a great deal more to say on the subject than I can. The number of ear cases in our hospital, which contains 2000 beds, is very great: I have a ward of seventy-five beds set apart specially for eye, ear, nose and throat cases. The class of ear cases which presents itself there is very largely the chronic suppurative variety. We do see a large number of cases of rupture of the tympanic membrane following high explosives. As to the situation of these ruptures, it has not seemed to me that there is any particular predominance of any one site. What we have noticed, and what we have tried to impress on the authorities there, is that interference with the ears, in the first place, should not be carried out at the Front. The patients nearly always come down with a history of having had the ears syringed. Last July, when we had these cases early, they came to us without having had this interference. We could then take care of them from the first, and we treated them as you suggested, Sir, and the result has been a satisfactory healing in the majority of cases. Where the rupture has been of considerable duration I found that nitrate of silver, 25 gr. to the ounce, applied to the edges of the rupture, stimulates the healing of it, so that in from six to eight weeks there has been complete closure, with marked restoration of hearing.

As to the psychical cases, they are, perhaps, the most pathetic we have to deal with. These men are broken in spirit, and their nerves are entirely shattered, and this condition is nearly always associated with mutism. It is, therefore, impossible to get any accurate results from our tests. We begin by encouraging these men to hear and speak. Often, however, those methods do not succeed, and then we try to shame the men out of their disability before their companions-in-arms. Sometimes those means are successful. One method was letting off an alarm apparatus suddenly: this shook one man so much that he eventually heard. I have nothing new to say about the subject, or anything to add to the pathology.

Dr. GORDON WILSON.

It has been my good fortune, during the last six months, to be associated with the Canadian Hospital at Folkestone, and I have had many cases of deafness associated with labyrinthine troubles; I have records of over 100 cases of nerve-deafness. Recently I was sent to France to see recent cases of concussion-deafness there. I have not yet had time to examine my specimens, but I hope to do so when I get back.

We divided our cases into three groups: (1) Nerve-deafness; (2) cases of men with what we call a fixed idea that they cannot hear; (3) malingerers. Rupture of the drum may take place at any part of it; I have seen several cases involving the *membrana flaccida*: in one case it was driven in against the promontory, with complete rupture of the drum. In France it was curious to note how many of the men had no hæmorrhage from the ear, because, it was said, the injury had been so slight. While I was at the Ypres salient and on the Somme I probably saw 250 cases of shell-shock. Only fifty of those complained of deafness, and of those fifty only seventeen had actual nerve-deafness—a very small proportion. But at that time things were quiet on the Somme—at the end of December and in the month of January.

With regard to the cases with a fixed idea, rapid recovery occurred under hypnotism. Some of the cases recover if cold water is run into the ear. We never use the electric current, because if we do the result is an irritation of the vestibular nerve, and the production of intense vertigo.

With regard to the treatment of our cases, we ascertain whether the labyrinth has any activity in those in which there is complete deafness on one side or both. In all the cases we had at Westcliffe there was none in which mutism was not present, and all of them had been under otologists for periods ranging from two to twelve months, and had been sent to us at the end, particularly Canadians. We first run cold water into the ear, and get a caloric reaction. If we do not get that we do not trouble. If we do we proceed, always using tuning-forks. If we use the C or the C<sub>1</sub> fork against the ear, we may not get a reaction, but by using both, and thus having a summation of stimuli, we get it. In totally deaf cases we proceed to use resonators. We get tubes like speaking-tubes in the ear. All this will be published in full later.

One thing which has interested us very much I would like to mention. We have had cases of wounds of the cerebellum, and the question has arisen in connection with the differential diagnosis of labyrinthine disease from cerebellar tumour. It has been our good fortune to keep some of our cases under observation for several months, and we have been able to show that pure cerebellar injury results in a form of nystagmus which is different from that found in association with labyrinth cases. I need not proceed to tell you how that is the case. I was very pleased to see Col. Gordon Holmes when I was in France, and to learn that he had a large number of ward cases which bore on that fact. There is nothing more important in connection with the ear than to be asked the question: Is that a cerebellar case or is it the beginning of a labyrinthine case? I think the war records will show that some of our most difficult cases of cure have been those in which a missile has cut the facial nerve outside the ear, or in which there was complete deafness which we could not touch at all. When I was in Paris I was much interested in noticing that the same thing may be said of the war experience in France. I wonder whether anyone has noticed, in the deaf cases following trauma,

a peripheral limitation of the field of vision as well as a peripheral limitation of hearing.

Mr. C. E. WEST.

I have found exactly the same thing as the last speaker just mentioned—namely, that the auditory field is contracted at both ends in these cases, and more or less symmetrically. I do not know whether in many cases the speaker found contracted visual fields as well. [Dr. WILSON: Yes.] The analogy of the two struck me so much that I use it as a metaphor in teaching.

I have seen comparatively few cases of direct injury of the ear while doing my war work, and that has surprised me. There have been a certain number of injuries of the pinna, cicatricial contraction, and so on, but they have been of no particular importance. Generally the collateral injuries are so much more important that one has to relegate the question of the ear to a secondary place.

One group of cases has struck me particularly—namely, glancing wounds of the temporal region about the ear without fracture, apparently a scalp wound only, but with the pericranium involved. In each one of those cases there was gross labyrinthine deafness. I saw this afternoon a gentleman who, years ago, had been shot at by a Dacoit in India, and received an exactly similar wound, and had just the same deafness on one side—in each case the same side as the injury, the other ear not being affected at all. How far it is permanent we do not know, because we have not the opportunity of following out indefinitely the cases which occur in the war, but the deafness is prolonged.

And we come across a large number of people who are said to be suffering from explosion deafness, and who, manifestly, are suffering from continued old chronic middle-ear suppuration without labyrinthine deafness or symptoms, or who have discovered, as the result of their own overhauling, after being blown up, that they have middle-ear deafness and are attributing it to shell-shock. A large proportion of the cases I have seen have been of that sort.

Another interesting thing is that there is a fashion in shell-shock effects. In the earlier days of the war there were a large number of cases of pseudo-labyrinthine deafness—people who recovered spontaneously or under some form of suggestion. Recently, at the First London General Hospital, these have been practically absent, and in their place there has been a stream of aphonics. I think these are largely due to suggestion: if a man thinks he will be rendered voiceless by being blown up, he is found to be so if he encounters that accident. With regard to people who, apparently, have true labyrinthine deafness, I do not know whether other surgeons succeed better, but I am hopelessly in the dark in regard to prognosis in these cases. A large number appear to recover almost completely, and the majority seem to get back useful hearing, slowly and gradually. A certain proportion of them seem to make no recovery. If anyone can tell me any bases for prognosis I shall be very grateful.

Dr. DUNDAS GRANT.

Like Mr. West, I have been surprised that we do not see more cases of clear-cut labyrinthine injury. A large number of them consist of very ordinary cases of chronic suppuration or chronic catarrh, down to



mere impacted cerumen. But there are many about which certain generalities may be stated.

My experience has been the same as that of our President and others: that where the membrane has been ruptured the involvement of the labyrinth, as a rule, has been very slight; in some cases the labyrinth has even escaped, though one of Mr. Fraser's sections seems to disprove that. That case appears to be an exceptional one.

I should like to know whether many members have seen what I should call an "in-driven" membrane. I have seen a few in which the membrane has been driven in and so closely related to the ossicles that the appearance was as if the ossicles were sculptured out, just as in an extreme case of relaxed membrane. In these cases the margin of the tympanum has been well defined.

With regard to the question whether a perforation with suppuration is recent or of old standing, or whether it is a recent traumatic rupture with subsequent suppuration, I think the best guide is the condition of the Eustachian tube. If it is quite patent, it is reasonable to think a traumatic injury of the drum is a recent one. If the suppuration has continued a long time and the Eustachian tubes are not very patent, it is impossible to say from this whether it is a chronic case or a traumatic rupture.

With regard to prognosis, of course when the caloric test is negative, the prognosis is probably at its worst. Another point is the upper range of audition, for when that is considerably lowered, the prognosis, as a rule, is bad. When that upper range is fairly well preserved, the prospects are good. I have gathered some statistics from thirty-one cases in which it has been tested. It was normal in twenty-five of them, there was slight lowering in three, and very considerable lowering in the remainder. In those in which it was preserved, the improvement was marked or very considerable. But in one case, at all events, in spite of that upper limit being preserved, there was no improvement, and it was found that there was a slow reaction to the caloric test. There were four cases in which the upper limit was preserved and there was no improvement.

With regard to the cases of deafness, a number of them came with the complaint of "deafness"; some of them had nerve-deafness, and the question arose as to whether there was nasal obstruction. I thought I should find it in a large number. Of fifty cases there was marked deflection of the septum in eleven, but thirty-one had nothing of the sort. Four had adenoids. Not all the cases of deflected septum caused any considerable obstruction.

With regard to the caloric tests, I would remind you of the apparatus for producing cold in the ear which I have before exhibited to the Section, and which has apparently been taken up by the Army otologists in France as a regular official test. It is a tube of copper, covered with a little cotton moistened with ethyl chloride. A current of air is driven through it, and as soon as it is at its coldest, as tested on one's own cheek, the patient's head is thrown back at an angle of 60° and he is told to turn his eyes to the opposite side, when nystagmus should be produced in from twenty-eight to thirty seconds. This obviates the dangerous practice of injecting cold water into the ear, in which a perforation may already exist. It has also been taken up by Moure in Bordeaux. The point through which the air enters the tube should be very small, otherwise the current is jerky. Dr. Paterson, of Cardiff, said it would be a good thing if we had an equally portable apparatus for making the hot

test. I show you an apparatus which will do this very quickly. Mr. Clayton Fox has helped me in testing many cases, and we find we get nystagmus to the same side in about fifteen seconds. Some members may devise an improvement upon it. Perhaps the bottle might contain a saturated solution of sulphate of soda, which is heated, and allowed to solidify again, and heat thus generated. In cases in which you wish to get nystagmus to the same side rather than to the opposite side—there being one in that direction already—this solves what has hitherto been a problem.

With regard to the cases of psychical deafness, much can be accomplished by re-education. You get them to hear a simple vowel, but you must not worry them too much, or you will throw them back into their nervous state. I do not think Col. Birkett drew a line of demarcation between psychical deafness and simulated deafness. No doubt the reason he has not done so is that there is no hard-and-fast line: there are so many cases which blend both. I had the case of an officer who said he was quite deaf. We tried the noise machine, and he rose to it at once. That might be called simulated, but I think it is psychic, because he had not been a neuropathic, but had been so shaken up that he was reduced to the extremity of exaggerating his complaint, which he had only in a mild form, and which probably existed when he was "buried." It passed off. I think the majority of the psychical cases have no simulation about them. A test which helps us is the pupil reaction. We know that any sensory stimulus will cause dilatation of the pupil; for instance, while the pupil is carefully observed, we blow a whistle, or, in an extreme case, a motor-car hooter behind the patient, and watch for dilatation of the pupil. But though a man may rise to that, it does not necessarily follow that he is shamming. To test it with success, we must have the pupil contracted by light, and see whether it dilates on the sound being produced.

I should like to put two questions, which I do not feel equal to answering myself: (1) What is the degree of deafness which justifies us in looking upon a man as being ineligible for general service? We see how one man who cannot hear the watch makes progress, while another may be very stupid. Is there any standard? I am thinking of listening-posts. The second question is, what are we to do with those who have suppuration of the middle ear? Must we send them to the Front or not? My friend Mr. Ki-ch, who was in Boulogne for a long time, said that no man who had even had a radical mastoid operation should be sent to the Front. But I think that is carrying it too far. I showed a case, about sixteen years ago, in which I had preserved a cholesteatomous membrane. The patient disappeared until last year, when he came back as a stalwart sergeant, who had been all through the war, and it was only discovered that he was deaf in one ear when he got injured in the other. Another case was that of a boy whom I showed here, who had suppuration of the middle ear. I opened a cerebellar abscess and the bulk of the jugular vein. He had been eighteen months in the war as a driver of the R.F.A.

I have spoken at this length about these things because there are some cases about which I feel a difficulty, and I shall be glad if other members can help me.

[Major SHUTER: Was the upper limit of audition taken by Dr. Grant by air conduction, or by bone conduction? And with what instrument?]

Dr. DUNDAS GRANT: I take it with as good a specimen of Galton's whistle as I can get—the original whistle. It does not go as high as the

monochord. I exclude as far as possible the function of the opposite ear. It indicates the hearing for a closed pipe of so many millimetres in length, and if the hearing is 1·5, 1·8 or 2, I pass the case as one of good preservation. I think that whistle is sufficient for all clinical purposes.

DR. JONES-PHILLIPSON.

Dr. Jones-Phillipson's contribution will be published later in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY as a separate paper.

Major SHUTER.

I would like to make a few remarks on one aspect of the subject. My experience has been with cases of ear injury some months after it has been inflicted—*i. e.* in the Australian troops who came from Gallipoli, and from the English hospitals.

I shall not speak of direct traumatism. I am in accord with most of what has been said, but I wish to speak of what is termed "concussion injury," and what a second speaker referred to as nerve-deafness. I have seen a large number of such cases, but my work has not enabled me to go so thoroughly into the matter as the last speaker has gone: mine is a roving commission. I differentiate, however, between machine-gunner's and concussion-deafness: in the former there are islands of deafness. I have seen a large number of cases which show the following combination of signs: They frequently occur in those who have a very patent meatus, and, contrary to Lermoyez's opinion, I found them more frequent in those with pre-existing middle-ear disease. Mr. Scott asked: "How do you know they have had pre-existing middle-ear disease?" In these cases the obvious signs of middle-ear disease are so frequent that, when one considers the number of normal middle ears compared with diseased middle ears, it is a reasonable opinion to state. They are due, not to sound waves, but to the wind waves caused by a shell explosion. I have seen them also in a case in which a German mine was exploded in a confined space; I have seen them in trench cases and after bomb explosions, in which the patient has been rendered unconscious and deaf for forty-eight hours. They present themselves some months afterwards with this combination of signs: marked diminution of bone-conduction, tinnitus, paracusis, hearing better in a quiet room, and hearing lower tones by air-conduction proportionately better than higher.<sup>1</sup> Yet apparently they have a very complete range of hearing. I should like to hear from some present why we assume that diminished bone-conduction and diminished air-conduction for the higher forks means nerve disease. I do not know where the statement originated, or on what reasoning it is based. One can physiologically alter the bone-conduction by putting the finger in the ear, or by inflating the ear, or by the Gelle test. It is altered very much by middle-ear disease, and a very pertinent fact is that it is greatly increased in cases where there is fixation of the stapes. I think in the cases I refer to there is some alteration in the conducting apparatus—it may be the ossicles, it may be the foot-plate of the stapes, or an alteration in the accommodating mechanism of the opposing action of the stapedius muscle and the tensor tympani. However, the matter has puzzled me, and I should like to know whether others have noted this combination of signs. I should welcome any expression of opinion.

<sup>1</sup> The range of hearing was taken by a monochord, which shows perception of pitch up to an average of 25 cm. by air-conduction, and 18 to 20 cm. by bone-conduction. This is only a little lower in my experience than a normal ear.

MR. SYDNEY SCOTT.

It is highly significant that the Dominion Governments should have sent representatives of otology to investigate the ear cases among their Forces in the Army. Our methods of practice in otology in civil life singularly well prepare us for investigating cases we meet with in warfare. After a little experience of the actual conditions near the fighting line, at the Base, and in England, I am convinced there is much for otologists to do. Certain cases of injury require considerable time to ascertain the true state of affairs. It is not sufficient merely to look at the drum and see how far a watch can be heard! Some cases will take an hour or more to examine. We need not only to apply tuning-fork and other hearing tests, but frequently have to investigate the vestibular functions, to say nothing of the examination of the nose, pharynx, and Eustachian tubes. And the results are well worth the same care we take in civil life. With regard to the hearing tests, there are three features I think we should consider. The first is the determination of the "tone-range," the second of "tone-acuity," and the third, "tone-analysis." The first is measured by forks and the monochord, which is far superior to Galton's whistle.<sup>1</sup> "Tone-acuity," for a given tone or group of tones of known intensity, is recorded by the distance-limit of hearing a watch or acoumeter. Under "tone-analysis" will come the faculty of hearing the voice as whisper or in conversation. We have met with patients who have a short tone-range, *e.g.* 16 d.v. to about 1000 d.v. or less, who can hear conversation at two or three metres. Others, whose hearing became defective after being buried by shell-fire, may retain normal tone-range and have very defective tone-analysis—that is, they exhibit great difficulty in distinguishing words of speech, especially in a noise. We meet with similar conditions in civil life, but they have been classed under senile or nerve deafness of doubtful cause.

The importance of considering the vestibular system is self-evident to those familiar with the manifestations which injury to the ear frequently evokes. But it hardly seems sufficient merely to say that the caloric test was done with hot or cold water, without observing precisely what the posture of the head was during the application of the test; for otherwise we may obtain normal reactions on both sides, with the head in certain positions, though a unilateral lesion actually exists. As an example, in a man suspected of malingering, I found by setting his head in requisite positions that one of his semicircular canals did not react to the caloric tests, whereas all the other five canals reacted normally. The results of "caloric" and "rotation" tests tallied with each other. The man had no appreciation for the short monochord in the affected ear (*i.e.* high limit was below 5000 d.v.), but he could hear my long monochord. The low tone limit was raised on both sides. He had active naso-pharyngeal catarrh at the time, and catheterisation definitely improved his hearing for low tones, bringing him back to the 16 d.v. limit, though it did not, of course, affect the high tone loss. Nevertheless the hearing became good and useful, both as regards tone-acuity and tone-analysis.

We all greatly appreciate the very fine work Mr. Fraser has sent us to-night. We see there one end of the story in the pathological findings in fatal cases subjected to the effects of high-explosive violence, but we have yet to see the concurrent clinical manifestations recorded side by side with such pathological findings. In the specimens which I showed

<sup>1</sup> "Discussion on Value and Significance of Hearing Tests," *Proc. Roy. Soc. Med.*, v (Sect. Otol.), pp. 113, 131.



last year<sup>1</sup> from the soldier who was wounded in the vertex of the skull, there was free hæmorrhage in the tympana, without fracture or rupture of the drum or any other injury such as we see in some of Mr. Fraser's cases, and although, fortunately, it was possible to test my case during life, the records were incomplete because suitable instruments were not available at the time. We hope this gap in our knowledge will soon be filled, as the result of such work as it is now possible to carry out. I think, Sir, we might commend to the War Office the appointment of more otologists to investigate and report upon the various forms of injury to the ear due to the war, in the way that that is being done in the Canadian hospitals for the sake both of the individual and State.

Capt. E. A. PETERS, R.A.M.C.<sup>2</sup>

Deafness due to gunshot wound and high-explosive concussion falls into three groups:

(1) (*a*) The membrana tympani may be ruptured by gunshot wound or high-explosive concussion; (*b*) the auditory meatus obstructed by a fragment of metal; (*c*) the middle ear may be filled with blood. The smaller extravasations are absorbed, but others break down into abscesses. The condition may occur as the result of the regional disturbance or high-explosive concussion.

(2) Labyrinthine deafness. This is probably due to hæmorrhage or vasomotor change. It is a very common form of war deafness, and the prognosis does not seem to be good. I have not been able to observe the microscopical condition, but that such a condition exists may be assumed (*a*) from the oedematous, congested state of the larynx observed after gunshot wounds in the proximity; (*b*) the hæmorrhage common in the brain with intact dura mater consequent on gunshot-wound fractures in the vicinity. It results from direct blows or high-explosive air-conducted concussion. The following is a typical case:

M——. Buried by a shell fourteen days previously; he was hit by a fragment behind the right ear.

0	S. watch	$\frac{2}{30}$
-15 seconds	c mastoid	Normal
18,000	Monochord	30,000
T. F. 64	Lower limit	T. F. 64

Rotation for external semicircular canal, clockwise: exaggerated nystagmus; anticlock, normal.

There was some evidence of fatigue, but no giddiness.

The patient is usually concussed, and the ear exposed to the fuller force is more affected. The semicircular canal system and cochlea may be affected in different degrees; the cochlea does not recover so quickly as the semicircular canals. Both ends of the register are affected, but the higher notes more regularly.

(3) Psychical or central deafness is comparatively rare. It is symmetrical and usually absolute deafness, and is often associated with mutism or stuttering speech. This form of deafness is dealt with by Major Hurst.

These three forms of deafness may co-exist, and contribute a factor in different proportions in a given case.

<sup>1</sup> "Histological Preparation of the Labyrinths and Tympana of a Soldier suffering from Deafness due to a Bullet Wound of the Vertex of the Skull," *Proceedings*, 1916, ix (Sect. Otol.), p. 28.

<sup>2</sup> Otologist to Royal Victoria Hospital, Netley.

(To be continued.)

## Abstracts.

### EAR.

**A Factor in the Prognosis of Acute Suppuration of the Middle Ear.—**

**F. E. Franchere.** "Annals of Otology," xxv, p. 857.

This factor is the variation in the cellular structure of the mastoid. The author advises X-ray examination in all cases of acute middle-ear suppuration, as the results will aid any decision as to opening the mastoid.

*Macleod Yearsley.*

**Acute Circumscribed Labyrinthitis.—Chalmette.** "Rev. de Laryngol., d'Otol., et de Rhinol.," May 31, 1917.

The interest of the case related lies in the sequence of clinical and surgical events.

*First.*—A definitely proved acute circumscribed labyrinthitis was successfully treated by expectant methods.

*Secondly.*—As soon as, but not until the labyrinthine symptoms had entirely subsided, the mastoid antrum was opened and drained.

The author's claim is that this case strongly supports an opinion which he (not alone—Abs.) holds; that such lesions have a natural tendency to spontaneous recovery, and that to operate during the evolution of a circumscribed labyrinthitis is to risk lighting up a fatal general labyrinthine and meningeal infection.

*H. Lawson Whale.*

### MISCELLANEOUS.

**Bronchoscopy in the Treatment of Asthma.—W. S. Syme.** "Brit. Med. Journ.," June 30, 1917.

After referring to the nasal treatment of asthma and to the importance of investigating the accessory sinuses, the writer proceeds to relate the histories of eight cases in which there was no nasal abnormality, and which were treated by the direct application of 10 per cent. solution of silver nitrate to the lining of the bronchi with the aid of the bronchoscope.

With the exception of a boy, aged ten, the painting of all cases was carried out under local anæsthesia, the patient lying on the left side with the head thrown back.

A fairly acute reaction followed, necessitating confinement to bed for a day or two.

The results of this procedure are said to be surprisingly good.

*Douglas Guthrie.*

**Observations on Chloramines as Nasal Antiseptics.—E. K. Dunham and H. D. Dakin.** "Brit. Med. Journ.," June 30, 1917.

The disinfection of the nasopharynx in meningococcus carriers has lately been the subject of much experimental research.

In the present paper the use of a 2 per cent. solution of dichloramine-T. in eucalyptol is recommended in the form of a spray.

The experimental results are tabulated and the chemistry and mode of preparation of the solution described. The article is very suggestive, but should be read in its entirety.

*Douglas Guthrie.*

## REVIEW.

*Otites et Surdités de Guerre.* Par M. BOURGEOIS et M. SOURDILLE.  
Paris: Masson et Cie. 1917, Pp. 185.

This small nicely got-up book is evidently intended for army surgeons who are being placed in charge of the special branch of otology in the French Army. And for this purpose it is excellently adapted, being at once brief, precise and lucid, and moderate in its opinions.

The writers agree with Dr. Sohler Bryant's recent expression regarding the frequency and importance of the ear injuries in modern war, the number of such affections, real or simulated, having exceeded all expectation. With regard to simulated deafness it is interesting to note that they lay most stress upon Gault's "cochleo-palpebral reflex," which consists in a contraction of the orbicularis palpebrarum when a loud sharp sound is suddenly perceived. The noise, we are warned, must be sudden and produced so as to surprise the patient, and, further, it can only be employed on one single occasion.

The authors believe, as do many otologists in Britain, that, although it may be impossible at present to prove with absolute certainty that the cases of shell-shock deafness we see are many of them purely or largely functional in nature, nevertheless the general aspect and demeanour of those invalids gives sufficient ground for a favourable prognosis.

Dan McKenzie.

## CORRESPONDENCE.

*To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.*

DEAR SIR,—Mr. Yearsley in the January number of this JOURNAL has painted such a rosy and attractive picture of endo-rhinology that one can almost visualise queues of ardent specialists waiting anxiously outside the instrument makers, impatient to secure a naso-pharyngoscope and enter the promised land forthwith. One finds no mention of rocks and shoals in the practice of this method, but I think one may fairly ask, Is it all plain sailing, and do the results obtained, generally speaking, point to its great practical utility in the future?

Five years ago I purchased a naso-pharyngoscope of the Holmes' variety, and have been using it from time to time ever since, and in my experience both the above questions must be answered in the negative, and it is my belief that the instrument is never likely to have anything like the same value as the cystoscope, on which it is based.

In the first place, the method is practically useless in children. The diameter of the tube of the instrument is about 30 per cent. greater than that of the largest sized Eustachian catheter in general use, and to attempt to pass such on the average child without a general anæsthetic is only courting disaster; exceptionally tolerant children with exceptionally wide meatūs are too rare to invalidate this argument.

Secondly, in some adults, even with the use of cocain and manipulating with all care and patience, the instrument cannot be passed into the naso-pharynx without trauma, and though in a larger number of cases it can be so passed after the application of cocain, this drug has the disadvantage of altering appearances considerably.

Thirdly, pus, blood, or thick mucus getting on to the reflecting surface of the instrument during its passage (which it is very apt to do) interferes with the view, and to wash out the nose previous to examination in such cases would, of course, spoil the picture.

It is true that many of the views obtained with the instrument are exceedingly pretty, especially as regards colour effects, but it is a method which can only be used effectively in a certain number of cases, and in my experience in only a small proportion of these can things be shown (*e.g.* the interior of the maxillary antrum), which cannot be seen by the older methods; consequently its advantages in the way of assisting in diagnosis and treatment would appear to be distinctly limited.

I have no desire whatever to throw cold water on the work of so progressive an otologist as Mr. Yearsley, but only to prevent disappointment to those who contemplate spending much valuable time in making routine examinations with this instrument.

No doubt the method will score occasionally, and as an adjunct to catheterisation, the passing of bougies, and such like in difficult cases prove useful, but possibly in the above drawbacks may be found some of the reasons why the text-books mentioned by Mr. Yearsley say so little about the naso-pharyngoscope.

W. H. KELSON.

LONDON, W.

### OBITUARY.

CAPT. JOHN NEVILLE GRIFFITHS, M.B.(SYDNEY), D.P.H.(LOND.).

MANY old and recent workers at the Central London Throat and Ear Hospital will be grieved to hear of the death, on active service in France, of Capt. John Neville Griffiths.

He was an Australian, the second son of the late Neville Griffiths, of Queensland, for many years M.P. for East Sydney. At School and University Griffiths combined distinction in study with success in athletics, being the winner of many scholarships, and for several years the tennis champion for Queensland. After graduation, he visited many parts of the world, including Vienna and Berlin, where he studied bacteriology.

Previous to the war, he was practising in London as a throat and lung specialist, but the bent of his interests was gradually turning to otolaryngology alone when the war broke out and snatched Griffiths, along with so many others of our younger men, away from the lines he had laid down for himself. And now the life has closed on the field of battle, and in spirit we offer the salute to a man of the highest character, keen in work, keen in play, and full of the sense of the reality and earnestness of life, yet withal endowed with a genuine simplicity and modesty of demeanour that endeared him to all who knew him.

He was married in December, 1916, and killed on November 30, 1917.

D.M.

T. KINLEY HAMILTON, Adelaide, S. Australia.

(Died December 6, 1917.)

Dr. Kinley Hamilton took his degree of M.D.Dublin in 1879 and his Fellowship of the Irish Royal College of Surgeons in the same year. He subsequently took his M.D.Adelaide (*ad eund.*) in 1885 and practised there in the speciality of the eye, ear and throat for many years.



## NOTES AND QUERIES.

ACKNOWLEDGMENT.—We regret that by an error of omission the paper on "The Morbid Anatomy of War Injuries of the Ear," by Dr. J. S. Fraser and Captain John Fraser, which appeared in the November and December (1917) issues of the JOURNAL and which was read at a meeting of the Otological Section of the Royal Society of Medicine, was not acknowledged as such at the time of publication.

### ACTA OTO-LARYNGOLOGICA.

A few years ago a number of Swedish, Norwegian, Danish and Finnish laryngologists combined in the worthy object of starting a journal especially devoted to laryngology and otology. This journal was called the *Nordisk Tidskrift för Oto-Rhino-Laryngologi*, and has now completed its second volume. It has been well produced and is full of interest, but, as most of the articles were published in a Scandinavian tongue, its valuable contents have not been available for the majority of mankind. This journal has lately extended its interest by combining with some well-known colleagues in Holland, and it will in future be less exclusively Scandinavian, and adopt a still more cosmopolitan character. The name of the journal will be *Acta Oto-Laryngologica*, and the various articles will be published in English, French, or German, according to the wish of each author. For all editorial communications the language used will be French.

Needless to say that we give the most hearty welcome to this journal. As the saying is, "la politica ci divide, la scienza ci unisce," and the progressive northern countries of Europe will, through this journal, not only advance our specialty, but will help to "the Parliament of man and the Federation of the world."

British laryngologists will shortly receive a circular inviting their support, and meantime we would suggest their sending any communication or reprints to Prof. Gunnar Holmgren, Sabbatsbergs Sjukhus, Stockholm, Sweden.

STC. T.

### ROYAL COLLEGE OF SURGEONS OF ENGLAND.

A Hunterian Lecture on "The Surgical Treatment of Trigeminal Neuralgia" will be delivered in the Theatre of the College on Wednesday, February 6, 1918, at 5 p.m., by Prof. J. Hutchinson, F.R.C.S.

A Hunterian Lecture on "The Incidence, Causation, and Treatment of Non-union of War Fractures of the Mandible" will be delivered in the Theatre of the College, Lincoln's Inn Fields, W.C., on Friday, February 8, 1918, at 5 p.m., by Prof. Percival P. Cole, F.R.C.S.

A Hunterian Lecture on "The Diagnosis and Treatment of Syphilis of the Central Nervous System" will be delivered in the Theatre of the College on Monday, February 11, 1918, at 5 p.m., by Prof. Hildred Carlill, M.A., M.D. (Cantab.), M.R.C.P. (London).

## BOOKS RECEIVED.

University of Iowa Monographs: Studies in Medicine. Vol. i, No. 10. Published by the University.

Asthma, Presenting an Exposition of the Non-passive Expiration Theory. By Orville Harry Brown, A.B., M.D., Ph.D. 1917. London: Henry Kimpton.

Injuries of the Face and Jaw and their Repair and the Treatment of Fractured Jaws. By P. Martinier and Dr. G. Lemerle. Translated by H. Lawson Whale, M.D., F.R.C.S. 1917. London: Baillière, Tindall & Cox. Price 5s. net.

Harvard Health Talks: Adenoids and Tonsils. By Algernon Coolidge, M.D. 1916. Cambridge: Harvard University Press.

THE  
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## HAIRY OR DERMOID POLYPI OF THE PHARYNX AND NASO-PHARYNX.<sup>1</sup>

BY A. BROWN KELLY, D.Sc., M.D.,

Surgeon for Diseases of the Nose and Throat, Victoria Infirmary, Glasgow.

A REPORT of the following case of hairy polypus and some brief notes on previously published cases of the same kind are warranted by the rarity of the condition and the lack of reference to it in most English textbooks.

A female infant, aged six weeks, was brought to the Victoria Infirmary on account of the frequent protrusion from the mouth of a long tongue-like growth which hung out until pushed in again by the mother. This had first been noticed when the baby was a week old, and since had been gradually getting more troublesome to replace. It was ejected after drinking or without any apparent cause.

On examination, an elongated growth was found to hang behind the tongue by a fine pedicle coming from the left side of the naso-pharynx; the exact site of origin could not be determined. On being drawn out of the mouth, it projected  $\frac{3}{4}$  in. beyond the lips (Fig. 1). The pedicle was severed as close to the attachment as possible by a fine snare passed up into the naso-pharynx; there was no noticeable bleeding. After removal of the growth, the infant breathed and swallowed better. Its subsequent progress was satisfactory and uneventful.

The growth had an elongated clubbed shape. It was slightly over 2 in. long, and  $\frac{1}{2}$  in. in diameter at its thickest part. It was of fleshy consistence, and covered with skin furnished with numerous very fine short hairs.

Microscopical report by Dr. John Anderson, Pathologist: The external layer consists of stratified squamous epithelium, 4-5 cells deep, with indippings of a few hair follicles. The underlying connective-

<sup>1</sup> Specimen shown at the Laryngological Section of the Royal Society of Medicine, December 7, 1917.

tissue is of a loose rudimentary character, and contains two or three minute glands. The central and greater part of the polypus is composed of tissue closely resembling fat.

#### NUMBER OF CASES.

The first recorded case of the condition under consideration, according to Reuter (1), was that of Ford—"An Account of a Hairy Excrecence in the Fauces of a New-born Infant," *Medical Communications*, vol. i, London, 1784. Reuter's paper, published in 1905, gave abstracts of the



histories of 19 cases he had collected in the literature and one of his own. In 1908, Bastgen (2), in his "Dissertation," referred to 27 published cases, and described one observed personally; this paper has not been obtainable. In 1911, Oppikofer (3) raised the total, including his own case, from 28 to 40: he also made reference to 5 other cases which were not in Reuter's collection, and presumably, therefore, had been dealt with by Bastgen. In 1914, Eves (4), when describing a typical case that had come under his care, referred to 12 others; these, however, either had been included in one of the above-mentioned papers or were not hairy polypi. In 1915, Graziani (5) reported a case, and referred to 2 others he had found in the literature. To

these I have to add 5 cases published respectively by Augier and Lavrand (6), Iwata (7), Pouget (8), Dombrowski (9), and Poynton, Higgins, and Pirie conjointly (10), which, together with my own, make a total of 50.

It is probable that these growths are much commoner than the number of reported cases would lead us to believe. Their occasional small size and the low visibility of the hairs may conceivably lead to their being overlooked or mistaken for fibromas, and not subjected to histological examination.

#### SYMPTOMS.

In a few instances the baby was born with the growth protruding from the mouth. In others, it was of such a size or so situated as to cause partial asphyxiation, and demand immediate removal. Most of the patients came under observation when only a few days old. Dyspnoea, attacks of suffocation, difficulty in sucking and swallowing, and vomiting led to the inspection of the throat, with the consequent discovery of the tumour. In some children the polypus was protruded from the mouth from time to time, especially during crying and coughing, on the cessation of which it was drawn in again or had to be pushed back by the mother. Occasionally it was so large as to hang out constantly. In Jewett's (11) case the growth protruded slightly beyond the lips, but, instead of being an inconvenience, seemed to afford the child much pleasure, as it sucked it diligently. Eves' patient, after chewing the growth for a little, swallowed with difficulty several times, whereupon it disappeared. The pedicle was then quite hidden behind the right posterior faucial pillar, and the bulk of the growth, according to the author, was evidently suspended in the œsophagus. In Dombrowski's case, the child, in order to breathe more easily, forced the growth, by some swallowing movements, into the throat, whence it was expelled on opening the mouth; it then occupied most of the isthmus, so that dyspnoea and cyanosis were produced. Poynton states that, on looking into his patient's throat, everything seemed natural until the child was made to gag, when the tumour suddenly appeared between the tongue and soft palate; it was evidently pedunculated, and moved with such rapidity that at one time it seemed to drop from the roof of the pharynx, and at another to fly up from the depths of the throat. In older patients, examination of the throat owing to an irritable cough or feeling of discomfort first revealed the tumour. In a few cases no symptoms were produced and discovery was accidental. There is no recorded instance of death having been caused by the tumour.

#### AGE AND SEX.

The age of the patient at the time of discovery of the growth varied from birth to adult life. More than half of the cases were under one year, and of these a large proportion was only a few days old. The growth rarely remained undetected until adult life was reached, but cases are on record in which the ages were twenty, twenty-two, and twenty-six years. Of the cases in which the sex was stated nearly five-sixths were females.

#### SITE.

The seat of origin of the growth is mentioned in 43 cases, in 25 of which it was in the naso-pharynx. The exact point of implantation in this region could not be determined in many of the patients owing



to their age, but is reported to have been behind the soft palate in 7 cases, and on the roof, posterior, anterior, and lateral wall of the nasopharynx in 4, 4, 2, and 3 cases respectively. Of 18 growths originating in the pharynx, 7 sprang from the tonsillar region (4 of these from the supratonsillar fossa), 3 from the posterior, and 2 from the anterior faucial pillar, 2 from the hard palate, 1 from the "palate," 1 from the posterior pillar and adjacent pharyngeal wall, and 1 from the posterior wall. A preponderating number did not come from the left side as has been suggested.

#### CHARACTERS OF GROWTH.

The growth has been described as having the shape of a club, pear, bean, hazelnut, cherry, tongue, lobe of a child's ear, part of a thumb, and once as having a broad base and tapering end. It is usually pedunculated, and the pedicle sometimes is very long and slender. It is of fleshy consistence.

The colour, as a rule, is greyish or white, like that of well-cared-for skin. In some cases, the proximal part of the pedicle is covered with mucous membrane and consequently pink, while the distal part adjoining the growth has a cutaneous covering; when both structures are thus present they are sharply demarcated.

The size varies considerably. Reuter gives the following measurements of cases collected by him: Length, 1.3-6 cm.; breadth, 0.6-5 cm.; and thickness, 0.2-1.5 cm.

#### STRUCTURE.

Hairy polypi are covered with ordinary skin more or less abundantly furnished with fine downy hair. The skin contains, in addition to hair follicles, as a rule, sebaceous glands; frequently, sweat glands; and occasionally, plain muscle fibres. The bulk of the tumour consists of fat filling the meshes of a fibrous connective-tissue matrix. In addition, striated muscle fibres, elastic fibres, cartilage bone, blood-vessels, nerves, lymph follicles, acinous, tubular, and mucous glands, and serous salivary gland tissue, probably representing an aberrant parotid, have been reported respectively as present. The pedicle contains blood-vessels and nerves, and may be covered in its proximal part, as above stated, with mucous membrane.

#### ORIGIN.

The structure of these polypi indicates an epiblastic origin, and their presence in the pharynx must result from a developmental disturbance. Their site is close to where the epiblast of the stomodæum fuses with the anterior end of the foregut, and it seems probable that in the course of the changes taking place elements go astray. Hence Hale White's (12) proposal of the term "inclusion dermoids." It is significant that a number of the tumours were implanted in the tonsillar region which corresponds to the second branchial cleft.

#### OTHER DEVELOPMENTAL ABNORMALITIES.

In only a few cases have other developmental abnormalities been recorded. In Avellis' case, the uvula was absent, the soft palate cleft in its posterior half, and the tongue cleft. In Clérault's patient, a newly-born infant with the growth attached to the middle of the hard palate, the soft palate was cleft, the tongue was united to the floor of

the mouth, and the two lips to the gums. Iwata's case, a boy, aged fourteen, in addition to the tumour, which was as large as a pea and seated on the upper third of the hypertrophied right tonsil, presented less development of the right half of the face, especially of the lower jaw, than of the left half, congenital malformation of the right auricle with closure of the meatus, and absence of taste in the anterior part of the right half of the tongue. In Thellung's patient, the soft and hard palate were cleft. Several writers report cleavage of the soft palate. Hanczel noted absence of the left posterior faucial pillar in his case. In Stooss' case, the growth sprang from the base of the skull, and a smaller one was situated to its right.

#### TREATMENT.

The method of removing the polypus which appears to have found most favour has been snaring. A loop of fine wire passed to the base of the pedicle severs the attachment easily and cleanly. There is practically no bleeding or reaction afterwards. The galvano-cautery snare, scissors, and knife have also been used.

#### ALLIED CONDITIONS.

Hairy polypi, as is evident from the foregoing account, constitute a well-defined group of tumours. On looking into the literature of the subject, however, one finds that some confusion exists, partly owing to growths of a different nature, but also caused by developmental disturbances in the pharynx or naso-pharynx, having been classed with hairy polypi, and partly to cases of hairy polypi having been reported under various designations, *e.g.* teratoid, teratoma, dermoid polypus, congenital polypus, etc. The classification given below may help to elucidate the matter:

(1) *Teratomas*.—(a) Entire fœtus, or part of a fœtus, with attachment to the palate, pharynx, or naso-pharynx. (b) Growths containing derivatives from the three blastical layers.

(2) *Teratoids*.—(a) Teratoid growths, *e.g.* hairy polypi: Congenital tumours derived from epiblast and mesoblast, having a covering of skin, but showing no tendency to the development of organs. These are frequently termed dermoid polypi by French writers. (b) Dermoid cysts: It is doubtful if such occur in the region under consideration.

(3) *Mixed Tumours*.—Arising from cells at the junction of two types of epithelium. Some may assume mildly malignant characters.

As an example of the teratomas reference may be made to Kidd's case of a child born with a growth attached to the palate and projecting from the mouth which demanded immediate removal owing to threatened suffocation. The mass measured 8 in. by 6 in, was covered with skin, presented the rudiments of certain organs, and was found to contain intestine as well as bone, cartilage, etc. Several authors, when discussing hairy polypi, have referred to the growth in Kidd's case as the largest on record, or as the only one containing structures representative of the three layers of the embryo; whereas, this mass was in reality a blasted fœtus, and in no way comparable to a hairy polypus.

An interesting class of growths is that of which Fullerton's (14) and Braislins' (15) cases are types. Fullerton's patient was a man, aged twenty, with a huge growth, which sprang from the right tonsillar region and extended across the oro-pharynx. After removal, consider-

able difficulty was experienced in deciding as to its nature. In parts it resembled a round and spindle-celled sarcoma, and, again, a fibromyoma, but, owing to the variety of structures found, the author came to regard it as a degenerated teratoma. Braislín's case was that of a male infant two days old, which suffered from difficulty in breathing owing to what appeared to be an enormous hypertrophy of the left tonsil. The growth was smooth, and showed no evidence of crypts. When examined it was found to contain cartilaginous masses, extraneous glandular tissue, angiomatous tissue, and other evidences, which led to the diagnosis of teratoma. In neither of the above cases is mention made of a covering of skin. Although Fullerton designated his growth a teratoma, the full and careful report given leads one to inquire whether it would not be more correctly classed if placed amongst the mixed tumours. The details regarding Braislín's case are scantier, but sufficient to show its similarity to Fullerton's and its dissimilarity to a hairy polypus.

Certain tumours of the palate are related to teratoma, and are described either as such or as mixed tumours. They may prove very perplexing to the histologist. Coffin (16) reports a case of this kind, and gives references to others.

The terms "hairy polypus" and "dermoid polypus" suitably designate the growths which are the subject of this paper. Although they are teratoids, this name is probably better avoided as apt to lead to confusion with teratomata, which form quite another class.

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**FIFTY CASES OF INNOCENT LARYNGEAL GROWTHS.**

BY ANDREW WYLLIE, M.D.,

Surgeon, Central London Throat and Ear Hospital.

## WITH PATHOLOGICAL REPORT

BY WYATT WINGRAVE, M.D.,

Pathologist, Central London Throat and Ear Hospital.

*(Concluded from p. 40.)*

These fifty cases supply us with several clinical features, which may be briefly summarised.

*Age.*—Benign growths attack all ages. We have recorded growths from the age of 4 up to 73 years. No age is exempt, but growths are rare between the ages of 6 and 20.

*Sex.*—Both sexes are equally liable.

*Occupation* is a decided factor. Patients who use their voice daily, such as army officers, singers, teachers, and clergymen are much more liable to laryngeal growths than those whose occupations do not entail speaking or shouting. Hawkers, shouting amid the traffic of the streets, sea-captains in the roar of the gale, and engineers amidst the rattle of machinery are specially liable.

*Hereditary Predisposition.*—None has been found. No sign of tuberculosis in any case. A history of specific disease was, however, noted in two cases, but the histology afforded no evidence of granulomatous or inflammatory infiltrations.

*Type and Habits of Patients.*—These are not definitely marked; growths are found in anæmic females and in strong robust men; in thin and in stout people. Nodes and small papillomata are generally found in young girls, especially in those who habitually strain the voice. Smoking seems to have no effect.

*Predisposing Causes.*—All forms of obstruction or growths in the air-passages of the nose, the nasopharynx or pharynx, such as polypi, enlarged turbinates, deviations and spurs of the septum, adenoid growths and septic tonsils, are predisposing causes.

Two cases (Nos. 47 and 48) were cured by an operation to the nose alone. Several cases were treated successfully by a complete rest to the voice, without any surgical interference.

As already mentioned, two cases had a history of specific disease, and were treated specifically after the growths were removed.

*Symptoms.*—The usual symptoms were temporary or permanent loss of voice, roughness, hoarseness, and a tired feeling or change in the character of the voice, but in some cases there were no symptoms, and in the others the symptoms were very light. For instance, Case 6 complained merely of an irritating cough, and a large papilloma was found. Case 13 complained of a slight difficulty in speaking. Some cases on the other hand, develop symptoms not directly referable to the larynx. Case 40 suffered from repeated attacks of epistaxis, and a sub-glottic growth was detected growing from the left vocal cord. The epistaxis disappeared after the growth was removed. There was no alteration of the voice, and no abnormality was found in the nose.



Vertigo, although attributed to laryngeal growths, was not met with in any of these cases.

*Site.*—These growths are situated on any part of the larynx: The ventricular bands, the anterior and posterior commissures, but most often on the vocal cords themselves. The ordinary laryngeal growth is generally found on the edge or upper surface of the vocal cord; sometimes below it. The anterior end and especially the left vocal cord is the favourite situation. In 34 cases the growths grew in the anterior part of the larynx, and of these 21 were on the left cord. Seven cases only at the posterior end of the larynx, and four of these were on the left cord. In 3 cases the growths were situated in the anterior commissure. Cases 7 (Fig. 1), 43 (Fig. 8).

It is unfortunate that so many growths seem to prefer the anterior end of the left vocal cord, as it is much easier to remove them from the right vocal cord, and especially from the posterior end of that cord.

*Origin.*—Benign growths develop in a simple manner. A mouth-breather or individual with some nasal obstruction obviously strains one or both vocal cords when singing or shouting. This leads to hyperæmia and rupture of minute vessels, and interstitial extravasation of blood. Later this develops into a localised hypertrophy, and subsequently a papilloma, fibroma, or angioma is seen with the laryngoscope.

*Treatment.*—The chief aim of the laryngologist is to remove the growth or growths as cleanly as possible without leaving any portion behind or causing any injury to the vocal cord or part of the larynx where the growth is attached.

There are exceptions when surgery is superfluous. For instance, in children suffering from a papilloma or even multiple papillomata, complete rest may ensure a cure. Sometimes temporary tracheotomy has to be performed if the child suffer from dyspnœa or other serious complication.

*Removal.*—There are two methods of removing laryngeal growths: the direct and indirect methods.

The direct method has many adherents, and is useful in nervous patients and in infants, who both need a general anæsthesia. It is easier to grasp the growth by the direct method, and so perhaps to more thoroughly remove it, especially if situated in the anterior part of the larynx or the anterior commissure.

By direct laryngoscopy the larynx and epiglottis are often injured by the tube, which may cause subsequent pain and discomfort.

We consider that direct laryngoscopy should only be employed when the indirect method fails, as the great majority of growths can be easily removed by the latter.

The indirect method is a simple operation for one's consulting-room, and was employed in 45 cases by laryngeal forceps, by snare, and by galvano-cautery.

*Laryngeal Forceps* are of several varieties, and each one suitable to its own type of case. MacKenzie's forceps succeed in most cases, especially if the growth be situated on the upper surface of the cords, or towards the posterior end of the larynx. Grant's forceps are specially fitted for growths on the edge of the vocal cords, but what we call the "universal forceps," viz. a Krause cutting-blade attached to a universal handle is applicable to all kinds of growth. This instrument is light, absolutely steady, easily manipulated, and does not obstruct the view as other forceps do.

The operation has occasionally to be repeated after a week's rest and

sometimes it is advisable, if a small tag is left, to use a fine-pointed galvano-cautery to destroy it.

The *Laryngeal Snare* was used in Cases 19, 37, and 40. This instrument removes pedunculated and subglottic growths with little pain and no hæmorrhage. It is easily manipulated when the larynx is well anaesthetised, but as the majority of laryngeal growths are somewhat sessile and friable, its use is limited.

The *Galvano-Cautery* is applied to a laryngeal growth by means of a long, fine platinum point. A special instrument was made for us (*Lancet*, November 23, 1907).

The larynx must be well cocaineised, and a suture inserted through the epiglottis to steady the parts. The cautery is very useful when a small part of the growth is left after an operation with the forceps, or when the growth is an angioma or cystoma.

Several years ago we advocated this method of removal (*Lancet*, November, 1907), but with more experience, serious drawbacks were found. For instance, the galvano-cautery, in several cases, caused swelling, œdema, and ulceration, and in one case marked dyspnœa. It was applied in 10 cases. In Cases 43, 44, 46, and 50, with marked success; one case appeared to be an angioma, and the other three very small growths. In Cases 16 and 42 the growths were first removed with Grant's and Whistler's forceps, and a few days later the galvano-cautery applied to destroy a minute remaining part. In Cases 18, 38, 39, and 41 there were such serious after-effects as dyspnœa, dysphagia, and prostration, that we consider the treatment too severe.

Another serious drawback to the galvano-cautery is that it does not admit of post-operative demonstration of the part removed, for an early stage of epithelioma might be diagnosed as benign until too late for satisfactory radical removal.

*Results of the Treatment.*—Thirty-eight cases were cured within a few weeks; in 6 cases the growths recurred, in 1 case several times; but all were ultimately cured.

Within the last twelve months we have examined 46 of these cases. Thirty-nine were perfectly well; 7 had some thickening and cicatricial tissue, which interfered to a certain degree with proper phonation. Four cases could not be traced.

The removal of laryngeal growths with instruments, "per vias naturales" is simple, but certain details must be practised. Patients must be drilled in the art of holding the tongue and breathing quietly and steadily. Considerable help can be given by the patient steadying the larynx with the left hand. The epiglottis should have a suture inserted through it with Horsford's needle and pulled gently forwards, Potassium bromide is prescribed several days previous to the operation so as to relieve the mental strain and lessen nervous excitability. A quiet room, good reflected light, and plenty of time and patience are essential. Thorough anaesthesia of the pharynx and larynx is most important. In the first place, the pharynx and larynx is sprayed with a 10 per cent. freshly prepared solution of hydrochlorate of cocaine, then a few drops are inserted direct on to the growth with a syringe, or a solution of cocaine (alkaloid) in olive oil is used. This subdues the irritating cough. (Wingrave.)

*After Treatment.*—This consists merely of absolute rest to the voice.

## REMARKS BY DR. WYATT WINGRAVE.

The writer published in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, May, 1906, an analysis of the structure of 50 cases of innocent laryngeal growths. That included three removed by Dr. Andrew Wylie. To these are now added 39 specimens, which Dr. Wylie has since submitted for examination, making a total of 42 cases from him.

Histologically the specimens fall into four distinct groups, into which they are somewhat arbitrarily divided, according to their predominant structural elements.

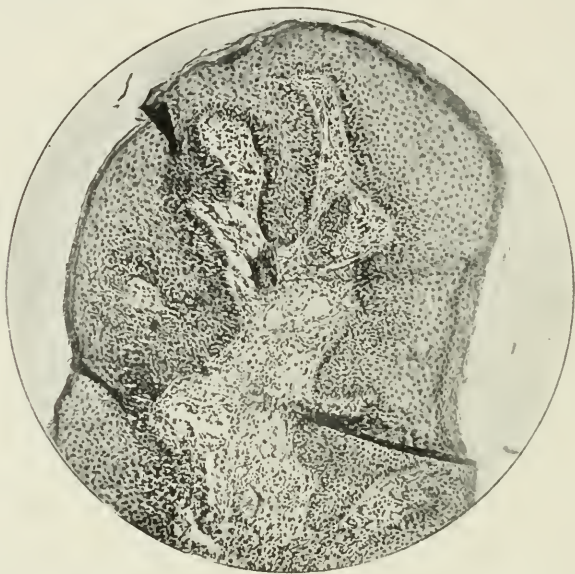


FIG. 10.—Shows one fimbria of a typical papilloma with seanty core.

(1) Fimbriated papillomata or true warts.

(2) Fibro-papillomata.

(3) Fibromata (firm).

(4) Serœdematous fibromata (soft).

(1) The first group or true warts shows a small proportion of fibro-vascular core, enclosed in a very thick layer of stratified epithelium, which is always columnar at its deepest part, becoming gradually more flattened as the surface is reached. In most specimens nuclei are present in all the layers, but in a few which have undergone "horny" changes, the surfaces are found densely packed and devoid of nuclei. These are "keratin" cells, and form laminated "pearls" or nests, often seen in the skin and exposed regions, but rarely on moist or mucous surfaces. When the larynx shares in a general keratosis of the throat, these horny excrescences are very striking, and may be the seat of various bacterial flora, but micro-organisms were generally absent in the cases under discussion.

The multiple form did not differ in their structure from the solitary.

(2) In the second group the core is relatively in excess, and the

surface epithelium much thinner, although thicker than on a normal cord. They do not present such deep fimbriation, being almost smooth to the naked eye. Blood-vessels are very thin, and pigmentation often presents the result of past extravasation of blood-ruptured vessels. It is more like exaggerated corrugation than a true wart, or may even be echinoid in appearance.

(3) The third group is somewhat different. It is generally small, sessile, and firm in consistence. Although thickened, the epithelium exhibits but slight deviation from the normal, but beneath it, instead of elastic fibres, there are only densely-packed colloid or white fibrous tissue bundles with few blood-vessels.

(4) In the fourth group, serædematous tissue predominates, presenting



FIG. 11.—A transverse section of a similar growth under a higher power. It shows the central blood-vessels.

the characters of an ordinary polypus, commonly, but incorrectly, called myxomatous. Chemically, there is no mucin as was once supposed. The framework or stroma is very loose, with but scanty elastin, considerable dilation of lymph spaces, and marked thinning of the arteries and veins, whose walls have lost their elastic fibres. It is, therefore, not surprising that they are often ruptured, and interstitial hæmorrhage common. Small vascular thrombi are often seen, together with free and enclosed pigment granules, derived from the blood. This feature is sometimes found in so-called "singer's nodes."

In considering the pathogeny of these growths, much will depend on their site and structure. It may be urged that to call them neoplasms is not quite accurate, for many are simply due to a localised hypertrophy of the normal tissue. The presence of old or recent clots and endovascular thrombi is strongly suggestive of an exciting traumatism, followed by serædematous changes and pigmentation, occurring in



a structure which has less than its normal elastic support. While the dense fibroid type may be the result of chronic irritation, in which

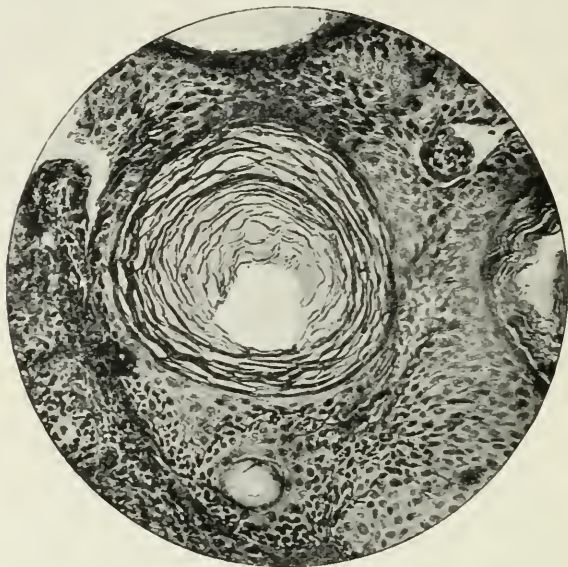


FIG. 12.—Shows several typical "pearls or nests," which consist of laminated dead epithelium containing keratin granules.

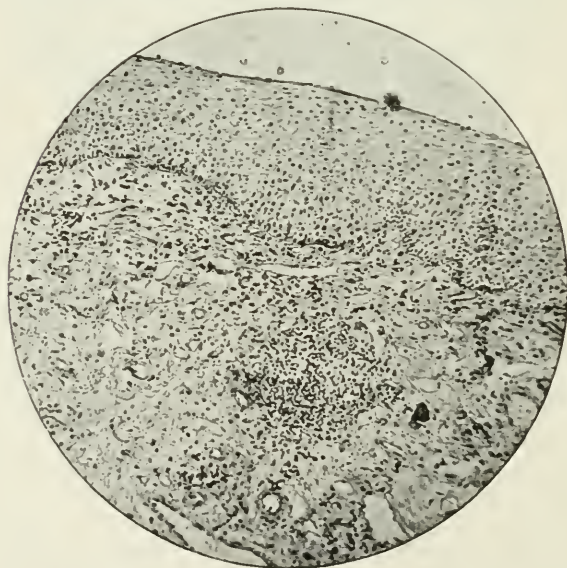


FIG. 13.—Shows plasma cells infiltration, which may be due to a past sepsis, or to irritation in any of the types.

fibrosis follows inflammatory or endothelial cells deposit. The origin of warts here may be the same as elsewhere, but there are two features

which are peculiar to the region: (1) Its special liability to irritation; its vulnerability, both vocal and respiratory. (2) The development of the glottis, in which the anterior commissure may assume the shape of a crescent or web. This normally undergoes suppression, but any interference may result in its but partial disappearance, followed by the persistence of vestiges or "tags." The not infrequent occurrence of multiple papillomata during infancy in this area is certainly significant, in there not having been opportunities for functional shortcomings.

The large amount of fibrous tissue attended by the characteristic red plasma cells and copper-coloured clasmatoocytes (when stained by pyronin-green) is very strong evidence that some inflammatory process has been responsible for the hypertrophy, or, at all events, has played a prominent part in its origin. But there is one feature which is peculiar to this region in the varieties except the true warts, viz. thrombosis. This, together with pigmentation (hæmaturic) and absence of elastin, may in a measure be responsible for the extensive and permanent serœdema. These morphological changes, and what may be termed functional traumatism, are together sufficient to explain the remarkable frequency of many of these local excrescences. Interstitial hæmorrhages with incomplete absorption is the basis of many so-called "singer's nodes."

## WAR INJURIES AND NEUROSES OF OTOLOGICAL INTEREST.<sup>1</sup>

By DR. C. E. JONES-PHILLIPSON,

Late Medical Officer in Charge, Ear, Throat, and Nose Department, Third Army No. 12 Stationary Hospital, British Expeditionary Force.

I HOPE I may be permitted a few remarks as one who has looked after the ear cases for the Third Army, having been doing that work for nine months. I had the good fortune to be located at Stationary Hospital No. 12, where the Surgeon-General concentrated ear work, allocated forty-four beds (indoor), and gave out-patient accommodation for eighty. All the work of the Third Army was passed through this Department, and I made notes of 1172 cases examined during that period. As will be seen from the abstract I analysed 100 cases of war injury of the ear, in which there were thirty-one cases of lacerations. I saw all my cases within twenty-four to thirty-six hours of their coming out of the trenches, some on the day of receiving the wound. A previous speaker, and a part of the President's address, laid no particular stress on the site of the laceration, but from my cases I regard that as very significant. In thirty-one cases the laceration occurred in the anterior-inferior quadrant in twenty; in the postero-inferior quadrant in six; in the inferior quadrants—i. e. between the two—in one; in the umbo in two; in the posterior quadrants across the two in one; in the antero-superior quadrant in one. It has also been asked whether any note had been made of rupture of the membrana flaccida. I had such a case, which is noted under the head "blood in the middle ear." No. 31 had a ruptured membrana tympani in the antero-superior quadrant, high up. There was a slow oozing of sero-sanguineous discharge for several days. Patient went to the base shortly after, and I thought it possible he had

<sup>1</sup> Paper read at Meeting of Royal Society of Medicine, Otological Section, February 16, 1917.

a fracture through the tegmen. He also had pains in the back of his neck and over the mastoid, and his face had been well peppered with fragments. I had four other cases of distinct blood-clot in the middle ear. In the case mentioned it was with rupture of the membrana tympani, in another without. The patient volunteered the information that he could taste blood in his mouth, and I thought it came through the Eustachian tube. I could not see it by posterior rhinoscopy.

Many also volunteered the information that they were knocked out or were unconscious, some remaining so for one or two hours. I had this verified in many cases. After this state had passed off the men were in a dazed condition, and often could not walk unassisted. The more profound cases had lost the power of speech, and two or three of the cases could not see. The major conditions often passed off fairly quickly, leaving dizziness and giddiness, which lasted for a long time. These cases I examined with great care. I found they showed a horizontal or rotatory nystagmus on turning the eyes to either side; I do not mean on turning the eyes to the extreme degree permitted by the orbit, because it will be produced in anyone by that means. In this connection I instance cases Nos. 23, 47, 48, 52, 56, 78, 83. It should be noted which side was most affected by the explosion. When it occurred on the parapet in front of the patient, he has a double, right and left, spontaneous horizontal nystagmus, or right or left according to the side affected.

One more little matter I would like to bring before you has reference to caloric tests. They require very much more water to prove a functioning or non-functioning labyrinth in the cases at the Front than in civil life, because these ears have been profoundly disturbed. You cannot tell whether a labyrinth is functioning unless you continue your test with hot or cold for three times as long as normal. In only two of my cases out of 100 did I find the caloric test brought no response—namely, Nos. 85 and 86. In these two cases I used as much as two and three quarts of water; they had intact membranæ tympani. Those were the cases which were most profoundly affected, both in regard to tuning-fork reactions and in response to the caloric test. The nystagmus varied—it was definitely “there” in all except Nos. 85 and 86—often very quick and feeble or very slow and feeble. In one case the nystagmus was very coarse, only comparable with the movements of the pendulum of a big clock—slow, with long excursions. In a few the nystagmus was quickly induced and very violent. The patient looked deadly pale, with extreme giddiness, faintness, and vomiting; in two the effect was so prolonged that the cases were unable to return to the ward for fifteen to twenty minutes.

With regard to movements produced by caloric tests, I do not wish to be understood to say that every case requires to be tested with a large amount of water to prove function of the labyrinth, but some labyrinths are profoundly depressed by the concussion, and are only slowly responsive. There are cases in which there is extreme activity, as in that of the lieutenant I have mentioned.

#### AN ANALYSIS OF 100 CASES OF WAR INJURIES OF THE EAR.

The war has afforded the opportunity to further the knowledge of injuries to the internal ear. Many obstacles are in the way, and much valuable information will not be recorded.

(1) Many cases were not examined owing to the severity of other



injuries: these were principally head cases under the care of surgical specialists, and one was reluctant to propose an examination and do the necessary tests, which might have produced disturbance and perhaps have retarded the progress of the case.

(2) *Post-mortem* evidence of damage to the internal ear might have been found, but these evidences would have been unaccompanied by definite symptoms complained of by the patient, as these cases were nearly always comatose.

(3) The transfer from firing line to base, and base to England, often quickly and always unexpectedly carried out, prevented me from repeating tests at intervals, and I was seldom able to watch a case for longer than fourteen days.

(4) The difficulty in tracing these cases later and in obtaining anything of value in the replies when obtained.

(5) In a hurriedly recruited army large numbers of men start military life as practically deaf men, and the increased loss said to be due to shell concussion can never properly be gauged.

#### *External Ear.*

Various degrees of laceration of the external ear are commonly seen—slits, perforations, or nearly complete severance of the auricle. They healed well and quickly. Two cases of severe perichondritis of the auricle with abscess formation were seen. Three cases of external ear injuries are here recorded showing no middle or internal ear damage.

(1) Pte. R. R.—. Cleaning up a billet by sweeping rubbish into a fire, a cartridge was swept in and exploded. A portion of the "fang" of the cartridge case went into the external auditory canal and was impacted there. There was no injury to the membrana tympani—merely an abraded canal.

(2) Pte. H. R.—. Bullet entered at the posterior border of left mastoid process, say  $\frac{1}{2}$  in. from tip, above and behind it. Opening seen in pharynx about 1 in. to mesial side of posterior pillar of left fauces, passed obliquely across the nasopharynx, striking posterior end of right middle turbinate, and out of right eye. Right antium was full of blood and right eye destroyed.

(3) Pte. P. W. P.—. An aerial torpedo burst and wounded him deeply at the back of the neck, behind right ear and lower jaw. Wound extended from the base of right mastoid process to centre of right sternomastoid; posterior five-sixths of origin of right sternomastoid destroyed, anterior one-sixth remains. Recurrent paralysis of right cord, complete paralysis of right half palate: affection of lower half of facial, and of cervical and brachial plexus. X ray showed fragments of shell deep down against cervical vertebra.

Notes of over 100 ear cases were made of patients who definitely attributed their deafness or increased deafness to the effect of "guns," "explosions," "bombardment," "being buried." An examination of the ears, nose, and nasopharynx was made in each case. Seventy per cent. of the cases examined showed pre-existing ear, throat, and nose conditions: defects due to otitis media suppurativa, 34; defects due to C.D.C., 22; defects due to nose and nasopharynx, 17.

In no case was the nasopharyngeal airway considered faulty or worth noting unless it was a distinct abnormal condition as shown by nasal obstruction, due either to deflected septum plus turbinate hypertrophy—hypertrophy of the turbinates alone—adenoids alone or in conjunction



with one or other of the former, and could be considered as a predisposing cause to a diseased condition of the ear.

It is my intention to compare the effects of explosion on the membrana tympani, middle ear, and internal ear: (1) In normal conditions; (2) in diseased and predisposing conditions.

Lacerations of the membrana tympani were seen in 31 cases: in normal conditions, 15; in diseased and predisposing conditions, 16.

Lacerations in pre-existing conditions are accounted for as follows: Conditions of nasal obstruction, 3; conditions of otitis media suppurativa, healed by scar, 5; conditions of C.D.C., 4; conditions of nasal obstruction and adenoids, 1; conditions of nasal obstruction and otitis media suppurativa, 1; conditions of otitis media suppurativa, with loss, 1; conditions of adenoids, 1.

Site of laceration in total number of 31 cases: anterior inferior quadrant, 20; posterior inferior quadrant, 6; inferior quadrants, 1; umbo, 2; posterior quadrants, 1; anterior superior quadrant, 1.

Laceration of membrana tympani: (a) intact membranes, 24; (b) with loss or scar, 7.

Hæmorrhages into membrana tympani (intra-membranous): (a) intact membranes, 16; (b) with loss or scar, 6.

Lacerations were irregular, tears or flaps. Their edges were always swollen and red. They did not heal well in the large majority of cases. The edges or much larger portions sloughed, especially when the laceration was flap-like. Many cases were seen within twenty-four to thirty-six hours of the damage. The parts were gently syringed with lot. bor.—or lot. hydrogen peroxide—10 vol. solution diluted four times with hot water, and a hot alkaline nasal wash prescribed. The surrounding ear parts were painted with tinct. iodi and 3 or 12 per cent. glyc. acid carbolic drops into ear, calomel, mist. alba, and the patients were kept in bed.

A subacute or acute otitis media, followed by suppuration, was present in the majority. When we know that very few wounds received in this war heal by first intention, such healing cannot be expected in ear cases, which are extremely dirty in the majority of cases. Intra-membranous hæmorrhages frequently sloughed and led to similar conditions.

#### *Blood in the Middle Ear (vide Nos. 39, 56, 60, and 76).*

Four cases of firm blood-clot in the middle ear were seen, bulging the membrane outwards. In one instance the membrane was quite intact, the clot could be distinctly felt, and the membrane bulged over it as three air bulbs. In two of these cases the patient reported that blood came into his mouth, and that he could taste it, but it was not observed by posterior rhinoscopy.

No. 39.—Pte. T. L——. Deafness since childhood; running ears; had acute pain in left ear. When on the battlefield he was in charge of the watercart, and slept only ten yards from the big guns. He complained of increased deafness and pain. There was blood-clot in the right posterior quadrants, and the left membrana tympani appeared as three air sacs covering a blue blood-clot; no perforation or discharge, and it could be felt by a probe.

No. 56.—Pte. G. L——. Had running ears when a child. Trench mortar shell burst near him and he was buried. Head became very giddy, with singing noises; he was like a drunken man; had staggering gait, which passed off. On the right there were three intra-membranous

blood patches; on the left a laceration, posterior inferior quadrant, and the middle ear was full of blood-clot. There was a very marked spontaneous horizontal nystagmus to left, and also to right. His labyrinth, right and left, was hyper-excitabile; his responses to the rotatory and caloric tests to right and left were easily produced, and were normal but exaggerated. The tuning-fork  $C_1$  could not be heard by air-conduction, and was shortened negative right and left. Fork  $C_2$  shortened negative right and left. Fork  $C_4$  very short right and left.

No. 60.—Gnr. S. S.—. A "Minnie" exploded twenty yards to the left of him, causing deafness in right and left ears, and noises and discharge of blood from the left. On the right there was a flap laceration, anterior inferior quadrant of the membrana tympani; the left was bulged, bluish-red. There was a middle-ear blood-clot, and a laceration at the anterior inferior quadrant. The labyrinthine tests, rotatory and caloric, were both feeble.  $C_1$ ,  $C_2$ ,  $C_4$  forks were all shortened, very short on the left.

No. 76.—Pte. H. B.—. Was cleaning the trench boards in a stooping position when a shell burst over him. There were shrapnel wounds of the face. He complained of left deafness, bleeding, giddiness; fainted at the time. On the left there was a laceration at the anterior inferior quadrant, an intra-membranous hæmorrhage, and blood-clot in the middle ear. The rotatory tests produced a very brisk after-nystagmus. The caloric tests, right and left, gave normal response, but hot irrigation of the left ear produced the tendency to fall to the right; hot irrigation of the right ear the tendency to fall backwards. Patient became very pale and vomited violently.  $C_1$ ,  $C_2$ ,  $C_4$  all heard short right and left, especially  $C_4$ . Weber to right.

In No. 31, with ruptured membrana tympani in anterior superior quadrant, high up, there was a slow oozing of sero-sanguineous discharge for several days (August 13, 1916, to August 21, 1916). He went to the Base on August 22, 1916. I thought he possibly had a fracture through the tegmen tympani. He had, in addition, pains in the back of the neck and over the mastoid; his face had been well "peppered."

In No. 63 the left membrana tympani was bluish-red. Laceration at site of inferior quadrant; strands of tissue could be seen crossing the laceration; blood was exuding. The right membrana tympani had a calcareous patch at the same site. This may be an instance of a calcareous patch, the weak spot of a diseased membrane, having been driven in by the force of explosion.

The frequency of the complaint, "recurrence of discharge following shell concussion" in old conditions of otitis media suppurativa which have been dormant for years, seems more than a coincidence. The discharge in these recurrences, and following recent lacerations, was noticed in most instances on the third day.

#### *Analysis of Symptoms.*

In order of frequency:

- (1) Deafness, increased deafness, "dulness in ears."
- (2) Noises in great variety (singing, buzzing, hissing, straining, thumping, bells, throbbing, ticking).
- (3) Giddiness, dizziness, "dazed."
- (4) Pain—soon passing off.
- (5) Bleeding, at the time, or noticed soon after.
- (6) Staggering gait, inability to walk, unconscious, dumbness, blindness.

Deafness was very marked soon after the explosion, always most on the side exposed to the full force; when the shell burst in front or behind a patient, both ears were affected. Patients who had been buried seem to have suffered more than others. The initial degree of deafness following the concussion soon passed off. The noises were often noticed only later, after the first degree of deafness had passed off. It was not often that increase in deafness was stated; as a rule, only the addition of noises to the previous condition. When the hearing showed further marked improvement, the persistence of the noises was a common complaint. Some patients reported being unconscious for from one to two hours; then feeling in a dazed condition, inability to walk unassisted, staggering gait; others that they lost the power to speak, or could not see. All these maximum conditions appear to pass off quickly; the lesser conditions, giddiness and dizziness, were complained of for seven to ten to fourteen days—anyway while under observation. These cases showed a horizontal or rotatory nystagmus, or turning eyes to the right or left. It must be noted whether both right and left sides were likely to have been affected at the time, or right or left only. It will be noticed that when both sides are affected there was a nystagmus to the right and left: when one side was affected there was a nystagmus to the opposite side. (*Vide* Nos. 23, 47, 48, 52, 56, 78, and 83.)

(*To be continued.*)

## SOCIETIES' PROCEEDINGS.

### ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

*Meeting on February 16, 1917.*

H. J. MARRIAGE, *President of the Section, in the Chair.*

MEETING on War Injuries and Neuroses of Otological Interest. For introductory papers, see JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, June, 1917, p. 177, by H. J. Marriage, and November and December, 1917, pp. 340 and 369, by J. S. Fraser and Capt. J. Fraser.

(*Concluded from p. 60.*)

Major A. F. HURST, R.A.M.C.

As a result of my observations on cases of functional deafness, deaf-mutism and so-called "hyperacusis" in soldiers in the Neurological Section at Netley, I have come to certain conclusions as to their ætiology.

(1) *Deafness*.—The deafness is hysterical and due to auto-suggestion. The momentary deafness, which is the natural result of the terrific noise caused by the explosion of a big shell in the immediate neighbourhood, may make such an impression on the mind of a soldier that, on coming to himself, whether he has actually lost consciousness or not, his first thought is for his hearing, especially if it was already impaired by preceding disease, and he may be so convinced that he is permanently deafened that he becomes actually deaf as a result of auto-suggestion. Hearing necessitates listening. Inattention during a dull sermon results in total deafness to the sermon, and in hysterical deafness the patient is so convinced that he cannot hear that he does not listen; although the sound

vibrations reach the ear in the normal way, they do not give rise to the slightest auditory sensation because of this inattention. The synapses at one or more of the cell-stations in the auditory path to the cerebral cortex must therefore be unswitched, probably as a result of retraction of the dendrons. I shall presently show that the auditory-motor or "jump" reflex is a function of the mid-brain. In the absolute deafness of shell-shock this reflex is abolished or greatly diminished. A very nervous but totally deaf-mute remained completely unmoved, never jumping nor showing a flicker of his eyelid during one of the severest thunderstorms I have known, and yet the next day he was completely cured by suggestion. In some cases the reflex is present when first noted, but disappears more or less completely when the test is repeated. One of the unswitched synapses must therefore be below the mid-brain, and either in the auditory nucleus or less probably in one of the intermediate cell-stations—the superior olive or the nucleus of the lateral fillet. It is very much easier to cure pure mutism than pure hysterical deafness, because by simple persuasion and re-education the mute can be induced to use the muscles involved in speech, and in severer cases the excitement caused by some unexpected event, or by alcohol or ether, is enough to cause involuntary speech, for when once a word has been uttered involuntarily the mute is convinced that he is cured. If this occurs in a deaf-mute, the return of speech generally convinces him that he can also hear; he therefore listens, and the unswitched synapsis is once more switched on. Deafness without mutism in shell-shock is, in my opinion, almost always of the same nature and not due to any gross lesion of the labyrinth, as so far as I know this has never yet been proved to occur in the absence of external injury; the ruptured drum often seen is also of small importance, as it in no way influences the rapidity of recovery in hysterical deaf-mutism. In spite of this it is often exceedingly difficult to restore the hearing in the absence of mutism, and many cases have, I believe, been regarded as the result of some actual destructive lesion because of their persistence. In such cases suggestion under hypnosis almost always cures unless the deafness is so absolute that the patient cannot even hear shouting through an ear-trumpet, in which case it is impossible for suggestions to have any effect, as the unswitched synapsis remains unswitched in hypnosis, and commands, which in other hypnotised individuals are immediately obeyed, do not reach the cortical centre of hearing, and are, therefore, not obeyed. As I have found that hysterical manifestations, such as contractures and anæsthesia, disappear during sleep, it might be expected that hysterical deafness would behave in the same way, but this is not the case. Three men suffering from total hysterical deafness without other symptoms were put into a hut by themselves. During the night an alarm of fire was raised, but, in spite of shouting and banging a poker against a shovel within a few inches of their ears, neither of the two who were asleep when the ward was entered woke up. The auditory motor reflex occurred in one patient, in whom it was present when awake, but in the other, who had no such reflex when awake, it was absent.

(2) *Exaggerated Auditory Motor or Jump Reflex, so-called Hyperacusis.*—A sudden noise normally causes an individual to jump and blink, and at the same time his pupils dilate; the "jump," at any rate, is a protective reflex, and represents the preparation for flight or fight. An officer, whose left motor cortex had been almost completely destroyed went to see "The Man that Stayed at Home" about four months after he was wounded. His right arm jumped violently when the gunshot



rang out on the stage, although no trace of voluntary movement returned until three months later. The motor part of the reflex is thus sub-cortical. In war neuroses, in which the reflex is exaggerated, jumping continues during sleep and deep hypnosis, although the patient does not hear the noise which induces it, even in a dream. That the reflex is quite independent of actual hearing is shown by the fact that during deep hypnosis, with the eyes open, individuals in whom the reflex is normal or only slightly exaggerated do not jump or blink, and the pupils do not dilate even when a poker is banged against a shovel within a foot of the ear, although they answer even whispered questions and obey whispered commands.

I have already pointed out that the reflex is abolished in complete hysterical deafness, so it must occur above the synapsis, which is unswitched in this condition. This suggests that the reflex centre is in the posterior corpus quadrigeminum or medial corpus geniculatum, and the close relation of these centres to the blinking and the sympathetic pupillo-dilator centre in the neighbourhood of the third nerve nucleus and to the anterior corpus quadrigeminum and red nucleus, in each of which a descending motor track originates, gives an anatomical basis for this view.<sup>1</sup> The very common exaggeration of this reflex in soldiers suffering from certain war-neuroses is not, therefore, correctly described as hyperacusis, for the sense of hearing may be no sharper than normal, and actual hearing need not occur at all, as the reflex occurs when they are asleep and hypnotised; it is simply a part of the general exaggeration of the defensive reflexes, which is a very characteristic feature of those war-neuroses that are due rather to emotions than to the actual concussion of pure shell-shock. In severe cases the patient appears to be in extreme terror: he jumps violently and trembles from head to foot at the slightest sound, and raises his arm as if to protect his face from a blow and hides his head under the bedclothes when anybody approaches him. Terror is at first actually present, for the patient never ceases to think of the horrors he has passed through, and he constantly pictures them before him, while every sound reminds him of the bursting of shells. But after all trace of terror has disappeared as a result of suggestion under hypnosis, and the patient no longer thinks or dreams of the horrors of war, the appearance of terror may continue unabated. This is due to jumping and flinching being defensive reflexes; the intense emotions to which the patient has been subjected leads to such an increase in the excitability of the central nervous system that the exaggerated reflexes persist after the cause of their exaggeration has disappeared. In one severe case true hyperacusis was also present, and Capt. Peters estimated that the patient heard sixteen times more acutely than the average normal individual. The hyperacusis and exaggerated defence reflexes were entirely uninfluenced by the administration of 100 gr. of bromide a day. The possibility of the jump reflex occurring in the absence of actual hearing, and being absent when hearing is not abolished, is of some practical importance, as I understand that the presence or absence of the reflex is often used as a test of complete deafness in mute children and in supposed malingerers, whereas its presence is not really a proof that actual hearing occurs.

<sup>1</sup> Since this note was written Professor C. S. Sherrington tells me that he and Forbes found that an incomplete jump reflex occurs in the decerebrated cat, and that both the posterior corpus quadrigeminum and medial corpus geniculatum were concerned in the reflex.

Mr. E. D. D. DAVIS.

My experience agrees with what you have said, Sir. But there is one question I would like to ask Dr. Gordon Wilson—namely, the difference between nystagmus of cerebellar injury, and that due to injury of the labyrinth.

Lieut.-Col. GOLDSMITH, C.A.M.C.

I shall address myself to the question asked by Dr. Grant, as to the amount of hearing necessary for a man to be in the Service, and the question of middle-ear suppuration. It is laid down in the Army Council instructions what amount of sight a recruit must have in order to be considered fit. That standard has been lowered as man-power has become more necessary. But the amount of acuity of hearing necessary has not been laid down, nor is it possible to lay down in an accurate way. The Canadian Army Medical Service has tried to lay down how far off a man should hear conversation voice in order for him to be placed in A, B, or C classes respectively. A man who hears ordinary conversation 15 ft. away in each ear, and who has no organic disease of the ear, can be accounted fit for Class A. But it must be known with certainty that the other ear has been carefully closed during the test and that the speaker has not been seen, because many men in the course of years have learned to get along by lip-reading. If a man who is at all deaf is put in a listening post, he may seriously endanger his company. If he can hear a conversation at 21 ft. with one ear and is deaf in the other, he is also classed A. The Canadian regulations are as follows:

*Hearing and Nasal Condition.*—Category "A": A soldier who can hear 15 ft. or better in each ear by ordinary voice, and who has no organic disease of the ear, shall be placed in Category "A." A soldier who has hearing of 21 ft. in either ear, but with little or no hearing in the other ear, but without active organic disease, shall be placed in Category "A." No soldier with a discharge from his ears shall be placed in Category "A."

Category "B": A soldier who has hearing of 15 ft. in either ear and little or no hearing in the other ear, and has no active disease in either ear, will be placed in Category "B" (i). A soldier who has better hearing than 12 ft. in each ear, but has a discharge from either ear of a moderate degree, or is subject to frequent recurrent discharge from the ears, of a moderate degree, may be placed in Category "B."

Category "C": Soldiers who show symptoms of chronic ear conditions, such as hearing reduced to less than 15 ft., with freely discharging ear or ears, or shell concussion deafness, shall be placed in Category "C." A soldier who has fully and recently recovered from a mastoid operation shall be placed in Category "C" for three months and then regraded.

Category "E": Cases that show repeated signs of recurring serious ear conditions, such as recurring mastoid pain, free formation of granulation tissue, indications of bone disease, or free, full, and offensive discharge from the ears, should be reported upon by an otologist, with a view to being placed in Category "E" for discharge as permanently unfit.

*Nasal Condition.*—Soldiers suffering from severe nasal obstruction should be sent to a specialist medical officer in charge of ear, nose, and throat diseases attached to one of the Canadian Military Hospitals, for

report, and if necessary, treatment, before being sent overseas, as it is found that such cases find it difficult, and in some cases impossible, to wear respirators.

**Tonsils.**—Enlarged tonsils which were present previously to enlistment should not be removed unless they show signs of chronic inflammation, or recurring acute attacks of inflammation interfering with Active Military Service. All cases, other than above, should be placed in Category "A." Where the removal of chronically inflamed tonsils will fit a soldier for Category "A," operation should be performed.

With regard to middle-ear suppuration, it is laid down in the Canadian Services—and I do not agree with it—that a man with middle-ear suppuration is not to be sent to France. Because a man has had discharge from his ear, it does not follow that he will "go sick" with it, and it will not do to say he is liable to mastoiditis or brain abscess, or acute suppurative labyrinthitis, since he is much more liable to be shot. A man whose hearing allows him to "carry on," and who has no active inflammatory condition in any of the surrounding structures, such as the labyrinth, the mastoid, or lateral sinus, can quite well go to France. And if you were now to bring from France all the men with chronic middle-ear suppuration, you would have battalions of them all over the country. In Boulogne, in 1914, I removed polypi which projected from the meatus, from dozens of men, and sent them back to the Front. They had some discharge from the ear, but it was able to escape, and the men continued to be just as good soldiers. As the demand for men becomes greater, aurists should not put greater difficulties in obtaining men in the way of the military authorities. A man may have middle ear suppuration for years without it causing him trouble, and the Regimental Medical Officer should not allow him to make use of it as an excuse to be sent back.

So far as concussion is concerned, it has struck me, on examining many of these cases, particularly for medical boards, that if you go into the history you will find many of the men have had deafness before the war, and their drums will show evidences of it, and particularly in that type of chronic middle-ear deafness with open Eustachian tubes and thickened drums, in patients who hear better in a noise but are not of the type called pure otosclerotics. These matters will be of great importance when dealing with pensions boards. If a man has been deaf before the war, and has been a lip-reader, that fact should be stated in reports. The amount of disability is based upon those reports, and it is very necessary that the aural report should be complete. If it says a man can hear ordinary conversation at 11 ft. with one ear, the word used in the examination should be stated, because when the case comes for review from the standpoint of a pension, someone else will examine him, and the same word should be used, otherwise the patient may say he is worse. I think Politzer's acumeter should be used in all these cases. At the present time these matters are carelessly recorded.

In recording the tuning-fork tests, which I think should be done, particularly in pensionable cases, so that a record for future comparison may be obtained, it is necessary when stating the result of the Rinne test to do so with two forks, C. 512 and C. 256, and to record how many seconds plus or minus. Furthermore, it is of value to record the low and the high limit. The high limit should be stated not by naming the highest fork heard, since this will probably not be more than C. 3012, but by recording the monochord reading, which definitely registers the



upper limit. In special cases labyrinthine tests will be required, and even a neurological examination. Schwabach's test should be similarly recorded, and it is to be remembered that in cases of neurasthenic deafness the fatigue period is particularly noticeable. Many cases of perceptive deafness hear all the high forks but for a shortened period, and it will add to the accuracy of the report if this record is made.

Experienced aural surgeons should make the special reports on ear cases just as ophthalmic surgeons are so required to do in Chelsea Board cases, so that there will be a definite record of the man's condition. This will be invaluable to those who have to report a second time, when the pensioner comes up for review, and will ensure that while the State is more carefully protected, the man suffers no injustice.

One should be very guarded in advising nose and throat operations during war time. I am sure a great many officers and men have undergone operative treatment for conditions which have existed before the war, and in whom active service has produced some increase of discomfort or inconvenience, but not enough for their state to be classed as a *disability*. The real disability is the operation itself, which entails that the State loses the services of the soldier for many weeks. My own opinion regarding us Canadians is that we do not react very well, after nose and throat operations, in this country unless we have been here a considerable time. Our soldiers are all subject to an increase in their rhinitis and rhino-pharyngitis, which will subside in warmer weather. I have seen many cases of officers and men who have returned from France with various wounds, whose stay in hospital has enabled a long-standing nasal condition to be discovered, and who have undergone operative treatment even though no disability has been present. In civil life we are quite justified in relieving discomfort and inconveniences in our patients if they wish for such relief, but in military life the services of the soldier belong to the State and we should be very careful that we do not take too much liberty with such services. Furthermore, I wish to draw your attention to the responsibility each one of us assumes when answering the question as to whether the disability is the result of active service, or whether it is aggravated by it.

#### MR. HUNTER TOD.

My experience of these cases, although not so great as that of others, as I am not attached to a military hospital, has been that bone disease, the result of direct injury by bullet or shell fragments, is more difficult to cure than in civil cases because of its more septic nature.

Partial nerve-deafness and tinnitus, unaccompanied by any lesion of the tympanic membrane, is not uncommonly caused by the explosion of shells or from a projectile passing close to the ear. This was well shown in one case, that of a sailor, in which the tragus was taken off and the concha pierced by a bullet which just grazed the side of the head. In association with the traumatic perforations, tinnitus seems to be the chief subjective symptom, especially in regard to prognosis. What answer can we give to the repeated question: "When will the noises cease?"

I am interested in what has been said about the caloric test. It is a very important test with regard to prognosis in internal ear concussion, and therefore also from the point of view of pensions. I had an officer who came to me shortly after the beginning of the war who was completely deaf for all sounds—the result of shell concussion—and he



had been so for three months. He took a long time to react to the caloric test, but as he gave a mild reaction I told him, although I then had no experience to guide me, that he would probably recover his hearing. He went to Scotland, and I understand that his hearing is now practically normal.

In answer to Dr. Dundas Grant, there is no standard of hearing for our Army. I once applied for a definite statement as to the standard of hearing required for recruits, but the only answer I received was that the hearing should be good.

In cases of middle-ear suppuration we surely should take the same sensible view as in civil practice—for instance, when testing for insurance. If there is perforation of the membrane, but no sign of bone disease, there is no harm in sending a man out to the Front. If there is bone disease of the tympanic cavity or its walls, or signs of chronic mastoid disease, I would not send him out, because even if the soldier has no serious symptoms at the time of examination, he will be a nuisance to the medical men at the Front.

I take advantage of this meeting to suggest that we might combine in representing to the Army Council that we should be better represented in the Army, and that aural consultants should be appointed.

#### MR. SOMERVILLE HASTINGS.

Since the beginning of the war I have seen a good many cases of injury at two fair-sized hospitals, and what has struck me most is, the amount of injury the normal ear will stand without permanent affection of the hearing power. I have seen comparatively few cases in which I could be sure the membrana tympani had been recently ruptured. Very many cases of perforation have come under my notice in which the deafness was stated to have followed a recent injury, but in only a few of these did the appearances agree with this. I have also noticed the frequency with which both types of concussion deafness occur in ears already injured by perforations without discharge, or by thickening of the drum, or scarring. Another point which has not been mentioned to-night is, I think, the frequency of cases of suppuration in which one gets a history that when the patient was a child suppuration in the ear occurred for a time, or in which there may be a large perforation with no history of suppuration at all. And yet suppuration starts again after a concussion, or after the man has been blown up by a shell, or buried in a trench.

#### THE PRESIDENT.

In the interesting discussion we have had many important points have been brought forward. I do not profess to be able to answer the questions which have been asked, as I have not had sufficient experience, my main work in connection with the wounded having been general surgery. This discussion has opened up fresh points for us to think over and to bear in mind when examining patients in the future.

## Abstracts.

### PHARYNX.

**Vincent's Angina in Liverpool Camp.**—H. Hastings Willis. "Medical Journal of Australia," May 5, 1917.

The observations are based on a series of eighteen cases, which came under notice last year at Liverpool Military Camp, near Sydney. The camp population varied until February from 16,000 to 18,000, and afterwards was more or less constant at 5000. The distribution of the cases did not suggest any special mode of transmission of the infection. No two consecutive cases came from the same locality. Clinically the disease resembled either diphtheria or syphilis, which was the usual admission diagnosis in the earlier cases.

Pain on swallowing was common to all cases. Swelling of the glands of the neck on the affected side was usual. Two types of case were observed. One, in which a pultaceous membrane covered the tonsils, the membrane could be easily removed, and the tonsils underneath were ulcerated. The other showed scant, if any, membrane, the tonsils were ulcerated to a variable depth in a punched-out manner, very much like a syphilitic ulcer. In the non-membranous cases inflammatory signs were often absent.

Swabbings were always taken and revealed the presence of the two causal organisms, the fusiform bacillus, and the spirillum of Vincent. The diphtheria bacillus was not present. Ordinary septic organisms were always present.

Attempts to grow the causal organisms on ordinary laboratory media under aerobic and anaerobic conditions failed. Methods of staining and examination are described. The most successful treatment was the local application of a solution of silver nitrate 5 to 10 gr. to the ounce.

Solution of hydrogen peroxide, both as a mouth wash and local application, was of value, which from the anaerobic nature of the causal organisms would theoretically be expected.

That the disease is infectious is certain; the mode of infection is not known.

While these cases were under observation the dental officers treated several cases of rapidly-spreading ulcerative gingivitis of sudden and unexplained onset, which healed quickly under local treatment. Neither amœba nor Vincent's organisms were found. The association of both conditions in one case observed leads one to suspect a similar origin. Vincent's angina must be added to the list of diseases which are the results of the aggregation of men in camps.

*A. J. Brady.*

**An Instrument to Maintain a Dry Field in Tonsillectomy.**—Sidney Israel. "The Laryngoscope," February, 1917, p. 102.

Recent reports of a large number of cases of pneumonia following tonsillectomy under general anaesthesia have stimulated Israel to devise an instrument to aspirate the blood which may find its way into the lower air-passages in these cases. The instrument consists of a bent Y-shaped metal tube which is so curved that it conforms to the contour of the nasal dorsum in order that it may lie flat and be out of the way of

the anæsthetist and operator. To the ends of each of the metal tubes which form the prongs of the Y a piece of rubber tubing is attached. This tubing is about 5 in. in length and has a number of small perforations at the distal end. One tube is inserted into each nostril and passes along the floor of the nose and then through the nasopharynx until it extends about one-half inch below the uvula. From the single barrel of the Y-metal tube a rubber tube connects with the suction apparatus. Israel finds that the gurgling sound that accompanies a general anæsthetic in patients with excessive secretion of mucus is entirely eliminated when suction is thus employed, and that the field of operation is kept free from blood and secretions.

J. S. Fraser.

### NOSE.

**Acute Osteomyelitis of the Frontal Bone: Operation: Recovery.—**  
**Herbert Tilley.** "Brit. Med. Journ.," July 7, 1917.

Describes a case of acute frontal sinusitis in a lady aged thirty-five. There was intense pain in the left eye and left frontal region, accompanied by redness and œdema and rise of temperature



Specimen from a former and fatal case of cranial osteomyelitis.

At the operation the anterior wall of the sinus was found to be red and soft, and on removing it pus and air-bubbles escaped from the cavity. At the margins of the sinus points of pus were seen in the diploëtic spaces, indicating a commencing osteomyelitis of the frontal bone. The pus contained *Staphylococcus aureus* in pure culture and also a few Gram-negative bacilli.

The after-treatment consisted of daily irrigations with normal saline and hydrogen peroxide. The temperature remained at about 100° F., and there was a free discharge of pus from the wound.

A week later an orbital abscess was opened, and a fortnight after that a mammary abscess appeared, but healed after evacuation.

The condition of the sinus, however, did not improve, and, as the patient was losing ground, a second operation was performed some six weeks after the first. A large flap of scalp was reflected from the frontal region, when it was found that the whole frontal bone was inflamed and partly necrosed. Loose portions of bone were removed, and in two places inflamed dura mater and brain substance came away with the bone. The wound was drained freely, the flap replaced and sutured, and fomentations applied. Rapid recovery followed, and the patient was able to go home within a fortnight.

Commenting on the case, Mr. Tilley remarks that this is the only case of acute osteomyelitis following acute frontal sinusitis that he has seen recover, although a few others have been recorded.

The case also illustrates the fact that an extensive operation may save a patient in whom osteomyelitis has set in as a complication of acute frontal sinusitis, whereas if the osteomyelitis occurs after, or as the result of, operation on the frontal sinus the condition is nearly always fatal.

In the present instance the writer refrained from removing an extensive area of bone at the first operation, in the hope that free drainage of the sinus would enable the infected surrounding diploë to recover.

To expose the infected area he recommends an incision commencing in the middle line beyond the hair, passing downwards and outwards to the temporal fossa and then forwards to join the frontal sinus incision at the outer angle of the eyebrow. The flap thus outlined is turned inwards.

Opinions vary as to whether osteomyelitis is more liable to follow operation on an acute or chronic empyema of the sinus.

The first ominous sign is inflammatory œdema of the soft parts which cover the margins of the bone wound, together with a rise of temperature. The infected area of bone should be freely removed, and no time should be wasted on small incisions, fomentations, or vaccines.

As measures of prophylaxis, care should be taken during frontal sinus operations to avoid infection of the exposed diploë, and the wound should be left widely open with only the lightest packing in the cavity.

Lastly, the possibility of osteomyelitis following intranasal operation on the frontal sinus is noted.

*Douglas Guthrie.*

## LARYNX.

**Safety-Pin in the Larynx Treated as Case of Diphtheria.**—H. L. Lynah.

"The Laryngoscope," February, 1917, p. 93.

Lynah records a case of a boy, aged seven, who was admitted to hospital December 21, 1915, with a history of laryngeal diphtheria of four days' duration. Examination showed no exudate on the tonsils and no nasal discharge. The larynx was not examined, but there was marked croup and retraction of interspaces. Intubation was not considered necessary, but antitoxin was given and the larynx poulticed. The temperature on admission was 103° F., pulse 140, respirations 36. After a series of negative cultures the child was discharged January 6, 1916. On January 28 the child was admitted to another hospital suffering from measles and "laryngeal diphtheria," and a second dose of antitoxin was administered. The resident physician, however, noted that the dyspnoea was caused by a large peritracheal abscess. On incising this a considerable quantity of pus was evacuated. The child gave a cough through the wound and then took a deep breath which aspirated



pus into the trachea and caused marked cyanosis. The Resident now rapidly introduced the tracheal dilator, and was on the point of inserting a cannula when he saw a shining foreign body in the tracheal fistula suddenly disappear downwards. After the introduction of the cannula a large amount of pus was coughed out. On the following day the tracheotomy tube was removed and an intubation tube introduced which passed below the tracheal fistula. Lynah himself now passed a bronchoscope and found the larynx partly filled with granulation tissue. The trachea was œdematous on the anterior wall and covered by granulation tissue. The tube was now passed downwards into the right bronchus and, just opposite the orifice of the superior lobe bronchus, a shining foreign body was seen and recognised as a safety pin with the keeper end presenting. The pin was easily turned, found to be closed and removed along with the bronchoscope. No anæsthetic was employed. The abscess cavity healed and the child was discharged cured.

*J. S. Fraser.*

### Repair of the Tympanic Membrane in Perforations of Long Standing.—

A. M. Dunlap. "The Laryngoscope," February, 1917, p. 83.

Dunlap believes that it is important to close perforations of the drumhead, not so much in order to improve the hearing as to stop repeated attacks of otorrhœa. Many of his patients in Shanghai were recent arrivals from the United States, where they had been living in a comparatively dry climate. In the damp climate of Shanghai, on the other hand, attacks of rhinitis brought on discharge from the ear. Dunlap, first of all, tried silver nitrate, incision of the edge of the perforation, the application of thin pieces of paper, etc., but got no success. Later he applied a 10 per cent. solution of cocaine for a few minutes, and then touched the edge of the perforation with a small cotton probe wet with a saturated solution of trichloroacetic acid. Care should be taken to wipe away all cocaine before applying the acid. The frequency of cauterisation should be regulated by the rapidity with which scar tissue is destroyed and granulating tissue secured for the entire circumference of the perforation. Treatment every third or fifth day proved to be best. Dunlap found that a perforation will not begin to close until there is an entire circle of granulation tissue. A great many cauterisations must be made in cases of long standing before there is any improvement, but when the perforation has started to close the process is very rapid. In two cases the membrane had become so thin in the part immediately surrounding the perforation that no growth of new membrane could be started until the perforation had been made much larger in order to give a firm base for the growth of granulations. At times it was necessary to use weaker solutions of the acid as the full strength apparently destroyed the new tissue. The tendency probably was to cauterise too frequently. In one case treatment was continued for more than a year without any decrease in the size of the perforation, and in three instances the perforations closed after the cessation of treatment. The size of the perforation and the age of the patient did not influence the final result, but entire absence of a definite drum membrane at some point in the circumference of the perforation did prevent cure. The hearing improved in practically every case, and, further, there was no tendency for the tympanic cavities to be involved during subsequent attacks of rhinitis.

*J. S. Fraser.*

**Wounds of the Larynx and Trachea in War.**—Moure and Canuyt. "Rev. de Chirurgie," Nos. 7 and 8, 1917; appeared in February, 1917.

The authors classify such wounds into (1) neuropathic, (2) extrinsic or extra-laryngeal, and (3) lesions of the laryngo-tracheal framework. The remarks on the last of these classes are the most interesting from the point of view of new matter. For gun-shot injuries of the laryngeal box the authors think that, as preventive treatment, tracheotomy is insufficient; they consider that it should be supplemented by laryngostomy and packing the larynx. (In the foetid condition, in which such wounds arrive at the base in France, this precaution against inhalation pneumonia is undoubtedly necessary. More often than not the missile has performed laryngostomy, and it only remains to remove the *débris* of thyroid cartilage and pack through the gap.—Trans.) The authors note that if, instead of tracheotomy, intererico-thyroid laryngotomy be resorted to, subsequent decanulisation is difficult, for cicatricial stenosis has meanwhile occurred just above the tube. (Usually the higher opening is used only as an emergency, and at the earliest possible moment replaced by a high tracheotomy.—Trans.)

As regards the authors' classification of laryngeal stenoses (after war-injuries) into "circular or tubular" and "annular," most surgeons would consider that these strictures are quite irregular in distribution.

Laryngeal autoplasty is referred to but not described.

*H. Lawson Whale.*

## EAR.

**Infection of the "Posterior" Mastoid Cells followed by Extra-dural Abscess.**—J. Rozier. "Rev. de Laryng., d'Otol., et de Rhinol.," Mars 15, 1917.

In 1901 Moure described occasional aberrant mastoid cells which he named "posterior." These are separated from all the cells communicating with the antrum by a thin shell of compact bone. Their average position is one inch behind Henle's spine, and their infection may simulate a suppurating lymphatic gland, and so cause delay in the recognition of an extra-dural abscess.

This is a moral drawn at length from a case, which is described in detail. Readers will agree with the reporter that aberrant cells should not be sought for as a part of the routine of a mastoid exenteration for acute disease, but that their possible existence should be remembered if the post-operative course of a case is not uncomplicated.

*H. Lawson Whale.*

## MISCELLANEOUS.

**Surgery of the Temporo-mandibular Articulation.**—L. W. Dean and W. F. Boiler. "The Laryngoscope," February, 1917, p. 65.

The proximity of the temporo-mandibular joint to the middle and external ear makes it of particular interest to the otologist. The fact that it is so frequently involved in diseases of the tonsils and of the peritonsillar structures and in dento-alveolitis makes it of great importance to the laryngologist.

It is not unusual in patients who come complaining of sore throat for the X-ray picture of the temporo-mandibular joint to show a collec-

tion of fluid between the condyle and socket. This condition may be secondary to a throat lesion or may result from a focus of infection in some other part of the body. The patients usually refer the trouble to the ear, but this can be excluded by otoscopic examination.

Ankylosis of the lower jaw joint may vary in degree. According to Blair, trauma is the most common single cause and accounts for 50 per cent. of cases which were usually due to a blow or fall on the chin. Suppuration following scarlatina accounts for 20 per cent., and other cases are due to otitis media, dento-alveolar abscess, typhoid fever, pneumonia, measles, variola, diphtheria, and rheumatoid arthritis. Congenital ankylosis is very rare and is due to trauma during delivery. The obstetrical forceps may cause fracture of the base of the skull or of the mandible, and this may be followed by ankylosis. The writers record three cases: (1) Bilateral complete bony ankylosis of congenital origin cured by operation; (2) fracture of the body of the mandible, in which a fairly good result was obtained; and (3) bilateral forward dislocation of the lower jaw cured by operation.

*J. S. Fraser.*

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### CORRESPONDENCE.

*To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND  
OTOLOGY.*

SIR,—I feel that Dr. W. H. Kelson's criticisms of my paper must be answered in detail, in order that the objections which he raises may be met before they deter others from using a method which I believe to be of great value to all those who aim at the rational (and not the rule-of-thumb) treatment of deafness.

Some of Dr. Kelson's objections are well put, some of them are mere "bogies"; to be disposed of, like a certain other "Bogey," by care in play.

I must, therefore, beg you to allow me a little of your valuable space for as short a reply as I can make.

(1) Is endo-rhinoscopy all plain sailing, and do the results obtained point to its great practical utility? To these I would reply "No" and "Yes." It is no more plain sailing, especially to the beginner, than is laryngoscopy or posterior rhinoscopy. I say unhesitatingly "Yes" to the second half of the question, and I should say it (on the same grounds as the "one sinner that repenteth") if I could only point to one case in which its use had been instrumental in saving hearing—and I could point to several.

(2) "It is practically useless in children." No, this is by no means the case. Granting that in its present form the instrument is a little too large (of which more anon), I have found it in some cases most valuable. In the cases quoted in my paper, one was a girl aged twelve, one a boy aged ten. With these children I had no difficulty whatever. And they were by no means solitary instances. But it is seldom that the instrument is needed in children. I have had one or two cases in which the instrument, used under an anæsthetic before operation, has yielded information most useful in character. I have had no difficulty in children younger than those mentioned. Personally, I believe that one can carry out with success in a majority of children most forms of examination, *provided* one is gentle, treats them as reasonable beings, takes them into one's confidence, and *never lies* to them. I admit that some children are

extremely difficult, but these belong to a minority and the majority can be "got round" by perseverance. But this applies as much to other methods of examination as to endo-rhinoscropy.

(3) There are, it is true, certain noses in which the instrument cannot be passed, but these are very few. As to the alteration of appearance caused by cocaine, surely the experienced rhinologist knows what allowances to make for these! In some cases such alterations are a positive help, as enabling one to see things that would otherwise have remained hidden. This was the case in one of my patients who had a small polypus at the opening of the frontal sinus.

(4) The washing out of the nose, before passage of the instrument, on account of pus, blood, or thick mucus getting on to the prism is quite a minor consideration. I did not mention this in my paper because I considered it too obvious and I was writing for trained rhinologists. Why should it make more difference to wash out the nasal passages before using the endo-rhinoscope than it does before practising posterior rhinoscopy, or before testing an antrum by putting the patient into the draining position?

A point that I ought not to have omitted in my paper is that the instrument should be warmed before introduction; also it is useful to rub a little oil over the prism, to avoid the obscuring effect of moisture.

I would ask Dr. Kelson whether any method of examination has ever yet been introduced which did not entail modification and improvement? Did Lannaec throw away his stethoscope because of the contemptuous opposition with which some of his professional brethren regarded it? Were the X rays abandoned because it was not always easy to locate a needle by their aid? The essence of progressive medicine is invention, and the stimulus to invention is not merely criticism, but *constructive* criticism.

I would suggest that two material improvements in the endo-rhinoscope would be: (1) Its reduction in calibre, (2) the abandonment of the curved for the straight instrument. Both these improvements have been carried out by Dr. Dan McKenzie in his instrument.

Dr. Kelson says that "no doubt the method will score occasionally." I suggest that it will score in the majority of cases and that this majority will grow with time. It is not the drawbacks of a method that keep it out of the text-books, it is the fear that so many authors seem to possess of what they are apt to style "innovations."

I thank Dr. Kelson for his criticisms, which have enabled me to add further to what I have already written on the subject, but still more for his calling me a "progressive otologist." In these semi-stagnant days of hesitation between the roads of palliation and prevention, the title is one to be proud of.

Faithfully yours,

MACLEOD YEARSLEY.

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## NOTES AND QUERIES.

PROF. GRADENIGO.

Prof. Gradenigo, we are interested to observe, on January 15 last, delivered the first of his course of lectures at the Oto-Laryngological Clinic of the Royal University of Naples. We wish our distinguished colleague every success in his new sphere of activity.



## A MILITARY MISSION OF AMERICAN SPECIALISTS.

Recently we had the pleasure of greeting Dr. Harris P. Mosher (Boston), Dr. de Schweinitz (Philadelphia), and Dr. Isaac H. Jones (Philadelphia), while visiting London on a Mission presided over by Dr. T. C. Lyster, Colonel of the United States Medical Corps. This committee of investigation was sent over three months ago by the Director-General of the American Army Medical Department—the well-known Dr. Gorgas of Panama fame.

They have been studying the special arrangements for the surgical treatment of injuries of the throat, nose, ear, brain, and head, together with attention to the medical aspects of aviation in Italy and France, where they visited the British and French as well as the American formations. In London they were deeply interested with a visit to St. Dunstan's, but their warmest admiration was reserved for the work done at the Hospital for Facial Injuries (Queen's Hospital), Sidcup, Kent. There they spent a long day following the service of Major Gillies and Capt. Hett in the British Pavilions, of Capt. Risdon in the Canadian Pavilion, of Col. Newland in the Australian Pavilion, and of Major Pickerill in the New Zealand Pavilion.

One of the members of the Mission has since written to us as follows:

"The day at Sidcup was truly one of the events of our trip. I have never attended a medical function which was more ship-shape in its arrangement and more fruitful. I longed to settle down there, get my hand in again, and learn the new things being done. Please express our pleasure to our hosts and our unbounded admiration of the work accomplished."

It is possible that, as a result of this visit, some American surgeons may take out a course at Sidcup on their way to the American front.

At a social gathering the same evening some sixty oto-laryngologists, several of whom had travelled up from the provinces on purpose, assembled to manifest their friendship and regard for our American *confères* and Allies. The gathering was honoured by the presence of Surgeon-General Goodwin, the new Director-General of the Army Medical Department, as well as many prominent London physicians and surgeons. Dr. Mosher found himself surrounded by many old friends, and he and his three colleagues made many new ones. STC. T.

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 BEAUTIFYING THE RACE.

In a recent series of lectures on anthropological subjects, Prof. A. Keith, who we need not remark, is always interesting and stimulating, has raised a question of great interest to oto-laryngologists. Referring to the gradual but undoubted disappearance of the old English facial type, that with which continental caricaturists of a generation past had familiarised the world—what some of us have termed the "rodent face," with its sharp, thin nose, prominent incisors, and receding chin—he suggests that the racial type is undergoing modification and alteration from reasons which he does not specify, contenting himself with a reference, rather vague it must be confessed, to the pituitary body, a gland which in these days has become rather a favourite *deus ex machina* for physiologists.

Now, with all due deference to acknowledged authority, it strikes us that a much simpler explanation than this lies to hand, and as it is one which reflects credit upon our own branch of medicine we need have no hesitation in giving expression to it.

The "rodent face" is, of course, the adenoid face. It is caused by adenoids, and many people go so far as to believe that it never does develop except when adenoids are present. Our explanation of the increasing scarcity of the rodent face in the English people, then, is that in our days of widespread operating, and in more recent times of school inspection, adenoids are removed more generally, more thoroughly and at an earlier age than ever before in history, and for this reason the adenoid facies does not get a chance to develop.

It has not yet entirely disappeared, however, and we may say, broadly speaking, that when we find an adult nowadays with the rodent face in full development then we know, at once, that we shall find the case to be, or to have been, one of neglected adenoids.

In other words, through our own efforts and through the day and daily efforts of those whom we teach, oto-laryngologists are bringing about an improvement in the facial structure of the entire race, and so may justly claim to be "beauty specialists" of the best and most successful kind!

DAN MCKENZIE.

THE  
JOURNAL OF LARYNGOLOGY,  
RHINOLOGY AND OTOTOLOGY.

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### THE OTO-RHINO-LARYNGOLOGICAL SERVICE IN ITALY.

By W. SOHIER BRYANT, A.B., A.M., M.D.(HARV.), F.A.C.S., MAJOR,  
M.R.C., U.S.A.,

Volontaire Benevole, Médecin Major Première Classe, affecté comme médecin  
traitant au service centrale d'Oto-Rhino-Laryngological de la 5ième  
Région, Hôpital Complémentaire No. 49, Orleans (Loiret), France;  
late Resident Medical Officer, Surgical Division, Royal  
Victoria Hospital, and Oto-Rhinologist, British  
Red Cross Hospital, Netley, Hants, England;  
late Major and Brigade Surgeon, U.S.V.

MAJOR ALEXANDER LAMBERT, M.R.C., Chief Surgeon the American Red Cross, at my request, allowed me to go to Italy under the auspices of the Red Cross. These auspices and the kind aid of Ambassador Thomas Nelson Page at Rome were sufficient to bring my task to a happy conclusion.

More than a year ago whilst still practising oto-laryngology in New York City, I heard the rumour that the organisation and efficiency of the Italian military oto-rhino-laryngological service was superior to the other Allies. The report was then current that in Italy very difficult operations on the head and throat were being performed. The most skilful Italian operators were already militarised and were getting surprisingly good results.

I find the Italian Army has advanced further in medical specialisation than the other Allies. Their various specialists are organised in close association. These specialised groups are found even in the first line field hospitals. The advantage of the Italian organisation shows itself in great efficiency.

The beginning of the present system dates back about one and a half years. At the commencement of the war, the Italian medical service looked on medical men as all alike, just as the other Allies have done.

Later, the doctors were organised on the basis of their individual abilities. The Italians say the advantages of the good specialised

military medical service are the same as for good specialisation in civil practice—efficiency. In Italy the specialists were organised with their most able members in command. Later, the different specialities were grouped to increase their combined efficiency.

The motive for the present Italian organisation, the Italians say, was not only to assure greater clinical efficiency, but, above all, for the more exact management of medico-legal cases. These cases include questions of exemption for military service, sick leave, change of arms, inaptitudes, reforms, auto-lesionists, exaggerators, and pensions.

The process of organisation is still progressing under the able leadership of *Maggior Generale Francesco della Vallé*, *Direttore Generale di Sanità Militare*, successor to Major-General Ferrero, who commenced these innovations in military medical service. The General Directors are appointed by the Minister of War.

It seems to me one reason for the early change in the system of the Italian medical service is due to the fact that the Italian service was at first much more scattered than the other Allies. The Italians used old buildings of moderate size for their hospitals, which made it very difficult to have a graded service. The other Allies with their larger hospital units, were not so terribly hampered. Consequently, they have not improved their service as much as the Italians; nor have they brought their service up to as high a point of specialisation and centralisation.

The original disadvantage of the Italian service has resulted in present superiority. Now there is a visiting Medico-Military Board that goes about seeing difficult cases and sending them to appropriate special centres for decision.

The grouping of the specialists makes it possible for them to decide at once, simultaneously and finally, on an individual case. Much time is saved by preventing the travelling of the patients from specialist to specialist. The errors were diminished in decisions made by the combined specialists. A more exact, even, and fair administration of the service was secured.

The service of oto-rhino-laryngological specialists extends forward to the divisions. Each army corps in the army zone, as well as in the territorial zone, has an inspector or consultant for the specialty.

Now there is an inspector-general in general surgery and one in general medicine. An inspector-general is soon to be appointed in oto-rhino-laryngology. There are already inspectors in psychiatry and ophthalmology.

The larger and more important grouping of the specialities is found at the medical centres of the territorial zone. Smaller special groups extend even to the first line of field hospitals.

The Italian hospitals are usually located in old buildings more or less adapted for the service. There is now some hospital construction going on. The Italian Hospital Service has the *Ospedale de Campo*, or field hospital, the *Ospedale Tappa*, or evacuation hospital, and the *Ospedale Militare Territoriale*, or base hospital. The *Ospedale Tappa* is much the same as the French *Hôpital d'Evacuation*, but smaller.

The oto-rhino-laryngological speciality is enormously important in this war, because of the great number of defective ears. This importance is seen chiefly from the medico-legal point of view, because there are so many cases of defective ears antedating military service, so many are caused or aggravated in the service, and so many are caused

by the auto-lesionists. In fact, the otological speciality may be said to be of more importance than all the other specialities put together, because of the great medico-legal importance of the ear. I find oto-rhino-laryngology no less important in Italy than in France. In Italy there are more auto-lesionists. After eliminating the cases of trachoma from the ophthalmological total, the number of ophthalmological patients in Italy is not greater than the oto-rhino-laryngological cases. In Italy, trachoma forms half the ophthalmological service. There are many more wounds of eye than of ear.

In the south, in one large centre, the total sick could be roughly divided into four divisions. The little specialities and general medicine were so small they could be disregarded. Two of the quarters of the whole belonged to general surgery, one quarter to ophthalmology, and the last quarter to oto-rhino-laryngology (almost all otology).

About 80 per cent. of the oto-rhino-laryngological cases are otological. Of these, about 90 per cent. are purulent ears. One of the oto-rhino-laryngological specialists calls chronic middle-ear suppuration "the plague of the war."

The hearing requirement in the Italian Army for service in the first line is the whispered voice of not less than 1 metre.

Otology is at present obligatory for the medical degree in Italy, but no examination is required.

The Italians are not hampered by material plethora, but they always have the essentials at hand. Italy has no luxuries, but does the best medical-military work. With their fine organisation and scientific spirit, the Italians everywhere achieve efficiency.

In Italy professional good feeling is everywhere obvious. Efficient medical service is nowhere absent.

To understand the high quality and advanced standing of the Italian medical service it is necessary to visit Italy. The Italian savant is exceedingly reticent concerning his achievements.

The following generalisation holds good: The oto-rhino-laryngological speciality is more important than all the other specialists put together, because of the great number of medico-legal cases it contains. In the oto-rhino-laryngological special service about 90 per cent. of the cases are otological, and nearly all of these are otorrhoea. The total number of the otological cases is about equal to the number of ophthalmological cases.

At Turin the oto-rhino-laryngological service is in a high state of perfection under the clinical and executive management of Tte. Colonnello Medico Prof. Dott. G. Gradenigo. Of all the medical achievements of the Italians the one that seems to me the most striking is the institute for the testing of aviators, organised to protect the lives of the aviators and saving the property of the State. This institution is the climax of the special service and the grouping of various specialities, concentrating efficiency. These are peculiarities of the Italian medical military service.

At Rome, Colonnello Medico Prof. Dott. Gherardo Ferreri is the leading spirit in oto-rhino-laryngology. His surgical achievements command admiration. The treatment of heart diseases and pulmonary tuberculosis are carried to a high point of perfection in Rome—difficult to realise without a personal inspection. Prof. Gosio, the State Bacteriologist, and his wonderful laboratory, shows the visitor one of the pinnacles to which Italian specialisation has climbed. Noteworthy



among the achievements of Prof. Gosio are the control of the plague, great success in management of meningococcic infection, and his unrivalled success in tetanic infections.

In contrast to the French Army the Italians have fewer acute ear infections. It appears the otorrhœas make up about the same percentage of the total sick in the two armies.

CONCLUSION.—The comparative importance and excellence of the Italian medical service challenges admiration, and I recommend that everyone interested in the service and administration of military medicine visit Italy to study the Italian organisation and efficiency. I cannot express in too strong language my appreciation of the patriotism, scientific spirit, cordiality, and hospitality with which the Medical Department received me everywhere. Kindly interest and courtesy were never lacking on the part of the Italians during my tour.

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### SUMMARY OF REPORT ON DISEASES OF THE EAR, NOSE, AND THROAT IN EGYPT FROM 1915.

BY JAMES W. BARRETT, TEMP. LIEUT.-COL., R.A.M.C., C.M.G.,  
M.D., M.S., F.R.C.S.Eng.;  
Consulting Aurist, E.E.F.

#### PART I.

ON arrival in Egypt in June, 1915, there was no aurist available, and by direction an Aural Clinique was established at the Australian General Hospital, in conjunction with the Ophthalmic Clinique, and was managed by the same staff, namely, two or three assistant surgeons, one medical student, and two nurses in the Out-Patient Department, with the use of a ward of 100 beds. The assistant surgeons were, mainly: Capt. Morlet, Capt. Stevens, Capt. MacLellan, Capt. Burke, and Capt. Rosenfield, A.A.M.C., and Mr. Cook and Mr. Wharton, medical students. The work was even heavier than the ophthalmic work, largely owing to the outbreak of measles which occurred amongst the Australian troops soon after landing in Egypt. Work continued, so far as I was concerned, until I was invalided to England in November, 1915. The first part of this report deals entirely with the period referred to in 1915.

(1) *General*.—The problem of dealing with diseases of the ear, nose, and throat differs essentially from that presented to the oculist. As pointed out in another place, the work of the oculist of the Army is a diminishing quantity up to a point, because once the refractions of those complaining have been worked out and glasses fitted, the refraction work is at an end, except in so far as new drafts are concerned. On the other hand, there are a very large number of soldiers who have been enlisted who suffered from otorrhœa with foul discharge, and they have usually suffered from this condition for many years. They make their appearance at the base hospitals and require attention, and are disposed of in the manner indicated later. There are in addition a large number of ear, nose, and throat cases which suffer from enlarged tonsils, adenoids, nasal obstructions, or diseases of the sinuses contracted prior to enlistment. The precise number of men who suffered from these varying conditions cannot be exactly estimated, but in Egypt they

probably ran into thousands. But when all these men have been finally disposed of, there remains a steady inflow of new cases which suffer from ear, nose, and throat diseases contracted whilst on service. It follows, therefore, that the clinical problem of ear, nose, and throat diseases is not a diminishing one to the same extent as the problem presented to the oculist, and the provision necessary to be made consequently differs considerably. The military work in both cases is important, and similar in character.

(2) *Statistical*.—The following figures show a rough classification of the diseases treated. They do not indicate the totals.

#### AURAL, NASAL, AND THROAT CASES.

Acute catarrh (middle ear) . . . . .	95
Chronic catarrh (middle ear) . . . . .	435
Otosclerosis . . . . .	138
Cerumen . . . . .	190
Otitis externa . . . . .	143
Concussion deafness . . . . .	139
Nasal catarrh . . . . .	114
Septal deflection . . . . .	96
Adenoids . . . . .	74
Polypi . . . . .	4
Enlarged tonsils . . . . .	12
Antra and sinuses . . . . .	14
Pharyngeal catarrh . . . . .	11
Aphonia . . . . .	8
Laryngeal growth . . . . .	1
	<hr/>
	1474

#### OPERATIONS PERFORMED.

##### *Aural :*

Mastoid operations . . . . .	17
Removal F. B. . . . .	3
	— 20

##### *Nasal :*

Adenoids . . . . .	73
Spurs . . . . .	34
Polypi . . . . .	14
	—121

##### *Throat :*

Tonsils . . . . .	41
	<hr/>
	182

The experience was that even at the outset far more clinical work was done in the aural than in the ophthalmic division.

(3) *Severity of Acute Otitis*.—The chief characteristic of the cases seen was the severity of the attacks of acute inflammation of the middle ear. It should be remembered that severe cases of measles and broncho-pneumonia were frequent. There were generally about 100 measles cases under treatment, and a steady stream of cases of acute inflammation of the middle ear flowed in, sometimes in association with

measles, sometimes without apparent association. The men, however, suffering from acute inflammation of the ear were often seriously ill, the temperatures were often  $103^{\circ}$  F., and at the end of a sharp attack the convalescent patient looked thoroughly exhausted. The severity was so marked and the condition so unusual that the pathologist of the hospital, Capt. Watson, made careful search, but found nothing except staphylococcus.

(4) *Adenoids*.—The other feature was the prevalence of adenoids. It is difficult to believe that these men enlisted with adenoids, since I have never seen so many adenoids in adults during a long period of private practice, and I am inclined to attribute the prevalence to the dust of the desert, laden as it is with organic matter, and to the severe colds from which these men suffered.

(5) *Otitis Externa*.—It will be noticed that under the heading "Otitis externa" there are a considerable number of cases. The prevalence of this condition, usually associated with otorrhoea, but sometimes independent of it, continues to the present day. This extensive distribution of furunculosis is, in my experience, peculiar to Egypt.

(6) *Concussion Deafness*.—A large number of men complained of deafness due to shell-shock. A number of the cases were not genuine, but the considerable number which were straightforward presented the usual symptoms of unilateral deafness due to gunfire. In some cases the membrane was ruptured, but they were not very numerous. Bilateral cases of concussion deafness were in almost every instance cases of hysterical deafness, and they underwent a remarkable recovery when placed on rigid treatment, and particularly when subjected to faradisation through the mastoids.

(7) *Malingering*.—The difficulty of discriminating between the real and the false is much greater in the case of deafness than of blindness, because an ear which appears fairly normal may be associated with otosclerosis and deafness. A number of misstatements were made by men with regard to their hearing, and a number of devices were resorted to in order to detect the fraud. Of these the most successful were the bandaging of the eyes and the testing of the hearing at different distances by unknown sources of sound. The examinee is unaware of the distances at which a noise-producing apparatus is placed, and gives discrepant answers. He is further unaware of the nature of the Rinne test by the tuning-fork, or of the fact that in middle-ear deafness a tuning-fork placed in the vertex is not infrequently heard best in the damaged ear, or in an ear artificially plugged. By these and a set of many other devices it was possible to show that, in a certain number of cases, the degree of hearing possessed did not correspond with the physical appearances of disease, and that it varied from minute to minute. Before leaving this subject, however, I should like to say again, both with regard to the ophthalmic and aural work done, that I should be sorry indeed to suggest that this attitude applied to more than a very small percentage of the men who came to the hospital and who really represent what may be termed as the "pathological residuum of the Army."

(8) *Operations of Election*.—As regards nose and throat diseases, a large number of patients presented themselves suffering from deviation of the septum and nasal spurs. It was obvious that they had suffered from these conditions all their lives, and that they had never troubled about them before. They were accordingly sent back to duty in the

majority of cases, with the advice that they could get them attended to when the war was over.

(9) *Fitness for Service*.—In the case, however, of the men who suffered from some degree of deafness, or from chronic otorrhœa, the important question arose of his fitness for service. If all the patients who suffered from chronic otorrhœa were to be discharged from duty, a number of fit men would be dismissed from the Army after the heavy expense had been incurred in sending them to and from Egypt. The risk of cerebral or general infection from otorrhœa is very small. This fact is abundantly proved by the large number of soldiers who suffer from this condition, and who have disregarded it for many years, or for the whole of their lives, and from the rarity with which general or cerebral infection is seen. During the whole of my work in Egypt, extending now for eighteen months, I have seen only two cases of generalised septic infection from otorrhœa. It seemed better to instruct the patient carefully respecting the cleaning of the ear, to curette out any polypi or granulation tissue, and to send him back to work. So far as deafness is concerned, a considerable degree of deafness, definitely proved, seems to me to warrant placing the soldier in class "B" permanently. A moderate degree of deafness, nevertheless, permits him to discharge all duties except sentry work. It is not safe to put a man who is deaf, or thinks he is deaf, in such a position. The broad view was taken that as this is a national war all men possible should be employed. These deaf or partially deaf men are all capable of earning a living in civil life in some capacity or other, and indeed do so. There must be some position in the Army for which they are fitted.

## PART II.

(10) *Improved Organisation*.—On return to Egypt in March, 1916, I was appointed Consulting Aurist to the British Force in Egypt, and have occupied that position since. In 1916 Egypt was well organised. The period of improvisation was over, appliances were available, and the problem was essentially different. A large number of clinics were established, aurists were placed at the principal hospitals, and, as time progressed, were placed also in the stationary hospitals, in casualty clearing stations, and even in the field ambulances.

(11) *Functions of Aurists*.—The functions, however, of the aurists in the base hospitals and in the other units on the lines of communication, were essentially different. The usual practice has been to transfer a man to the base who reports sick with ear, nose, or throat disease for the first time, unless the case is trivial. The case is thoroughly examined and treated at the base hospital, and is then returned to the Front, a full clinical report being sent to the A.D.M.S. of the Division. The case cannot be sent down a second time unless symptoms have re-developed, and without seeing an aurist in the field ambulance or in the lines of communication. Consequently, it was the business of the aurist placed on the lines of communication to treat and return to the Front all comparatively unimportant cases, and to transmit to the base, as speedily as possible, anything of importance. As these arrangements were completed, the bulk of the work was transferred from the base to the fore-part of the lines of communication.

(12) *Distribution of Cases*.—The statistics show that the aural cases constituted two-thirds to three-quarters of the total work of the aurist.



Nasal, pharyngeal, and laryngeal diseases, apart from diphtheria and tonsillitis, constituted one-quarter to one-third of the total, and of the aural diseases—the infective group—namely furunculosis and chronic otitis media, constituted at least two-thirds.

(13) *Treatment Adopted.*—For the purpose, then, of producing efficient soldiers, the problem became one of the management of otitis media and furunculosis. The method of treatment adopted in these cases is indicated in the circular which follows. I think it is probably correct to say that never before, in any civil clinique, has the treatment been carried out in the same thorough and systematic way. It would certainly be impossible in civil life to be sure that people dry out the last minim of pus in an ear in the same way that the instructed soldier does. The result has been remarkable, and every specialist in Egypt has been impressed with the fact that chronic otitis media, with foul discharge, of long-standing, sometimes of years, has been brought under control, and often cured in a few weeks by the simple purification method. They have further become convinced that the radical mastoid operation, so often performed in civil practice, begins to appear in the light of a luxury, as it certainly is not usually a necessity. There is, so far as I am aware, no record of a general infection having taken place from an ear which was under treatment. The few infections, about a dozen, which did take place during nearly three years, were in cases which had not reported sick, and had apparently never received treatment.

(14) *Statistical.*—The statistical table which follows applies only to a portion of the period. It is not published with a view of giving any idea of the absolute number of cases treated, but with a view to indicating their relative distribution :

#### STATISTICS RELATING TO DISTRIBUTION OF DISEASES OF THE EAR, NOSE, AND THROAT.

##### AURAL DISEASES.

###### *External Ear:*

Cerumen . . . . .	332
Otitis externa and furunculosis . . . . .	352
Eczema . . . . .	47
Injuries and foreign bodies . . . . .	7

###### *Middle Ear:*

Acute otitis media (dry) . . . . .	23
Chronic otitis media (dry) . . . . .	371
Acute otitis media suppurative . . . . .	65
Chronic otitis media suppurative . . . . .	1173
Mastoiditis . . . . .	33
Gun-shot wound . . . . .	5
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(15) *Shell-shock*.—A good deal of discussion has arisen from time to time as to whether there is such a thing as deafness, the result of shell-shock or nervous disturbance. The malingeringer is not uncommon, but he can usually be detected. Men suffering from hysteria are not uncommon, certainly far more common than in civil practice. Unilateral deafness, due to gun-fire or explosion, is not uncommon, and rupture of the drum, due to the same cause, is not infrequent, but when we have eliminated the malingeringer, the sufferer from bilateral hysterical deafness, and unilateral deafness, due to gun-fire, is there such a thing as bilateral deafness due to shell-shock? Personally, I have not seen such a case, but some of the aurists in Egypt state they have seen a few cases where the deafness appeared to be labyrinthine in origin. I feel inclined to sum up the position with regard to deafness in the same

manner as I summed it up with regard to blindness; the bilateral deafness, due to genuine shell-shock, was a rare condition, that hysterical deafness, due to nervous collapse under the circumstances of war, was fairly common, and usually remedied with ease. In the discrimination between the organic and the nervous cases of hysterical deafness, the caloric test was freely used. Where the result was negative, the fine question was opened up as to whether the loss of the vestibular reaction implied the destruction of the cochlea. An attempt was made to settle the question by the use of the Wassermann reaction, as at least one case of loss of cochlear reaction, supposed to be due to shell-shock, turned out to be due to syphilis.

*Conclusion.*—The principal business of the aurist in the war zone is to see that cases of chronic otitis media are efficiently cared for, and are kept on duty at the Front. Apart from this paramount duty, he will have a good deal of work to do in recommending cases of deafness due to dry catarrh for classification, and a certain amount of work to do on the lines usually followed by a specialist in civil practice, subject to the proviso that any condition that may have existed prior to the war can wait till the war is over for rectification, unless it distinctly interferes with the man's efficiency as a soldier.

#### INSTRUCTIONS FOR CLEANING THE EAR PASSAGE.

(1) The patient should pass the hand of the side opposite to the ear affected over the top of the head and seize the upper part of the ear with the finger and thumb. The ear should then be drawn upward. This straightens out the ear canal. A small piece of wool should be firmly wrapped round a wooden match and introduced into the ear passage with the disengaged hand to a depth of about  $\frac{3}{4}$  of an inch to 1 inch. No force should be used but with care the matter can be mopped out of the ear and rendered *quite dry*.

It is desirable to cut off the end of the match used for ignition.

(2) The head should be turned on the sound side and the diseased ear passage filled with the drops (which should be warmed in winter). The drops should be allowed to remain in the ear five minutes.

(3) The ear passage should again be *thoroughly dried out*.

(4) A small piece of wool should then be placed in the ear to exclude dirt.

The most convenient drops for general use are:

Spirit vini rectific.	} Equal parts.
Lotio acidi carbolic	
(1 in 15)	

The patient should be inspected by the medical officer once a week.

## TWO INTERESTING CASES OF MIDDLE-EAR SUPPURATION WITH COMPLICATIONS.

By J. K. MILNE DICKIE, M.D., F.R.C.S. (Edin.), Capt., R.A.M.C.

THE following cases came under my care while attached to No. 7 General Hospital, B.E.F.

They are interesting from their clinical course and also from the variety of diagnoses which were made in both instances. Both cases are fairly clear from an aurist's point of view, and this illustrates the importance of examining the ears in all cases with rigors and severe illness of obscure origin.

CASE 1.—Pte. A. K—, aged twenty-two. Seen first July 8, 1916. Had been in hospital in a medical ward for about a fortnight as a case of influenza, then as

trench fever, till finally he was spotted as an ear case and the writer was sent for. I found that he had been ill for nearly three weeks. Before admission to hospital he had been very giddy, and had felt everything moving round him. After admission he still suffered from giddiness, had very severe and persistent headache, pyrexia, and pain in the right ear. He had vomited on July 8th, 1916. He complained of very severe frontal and occipital headache, and was very drowsy. There was no paralysis. He had a very copious discharge from the right ear. There was distinct mastoid tenderness, though no swelling. Pain was elicited on tapping all over the right side of the head. There was a slight spontaneous rotatory twitch of the eyes to both sides. There was absolute deafness in the right ear with the noise-box in the left ear. A tuning-fork on the vertex was heard only in the left (the good) ear. Cold syringing of the right ear for two minutes produced no nystagmus. The right tympanic membrane was not well seen, on account of the pus welling out and owing to bad light. The head could be bent

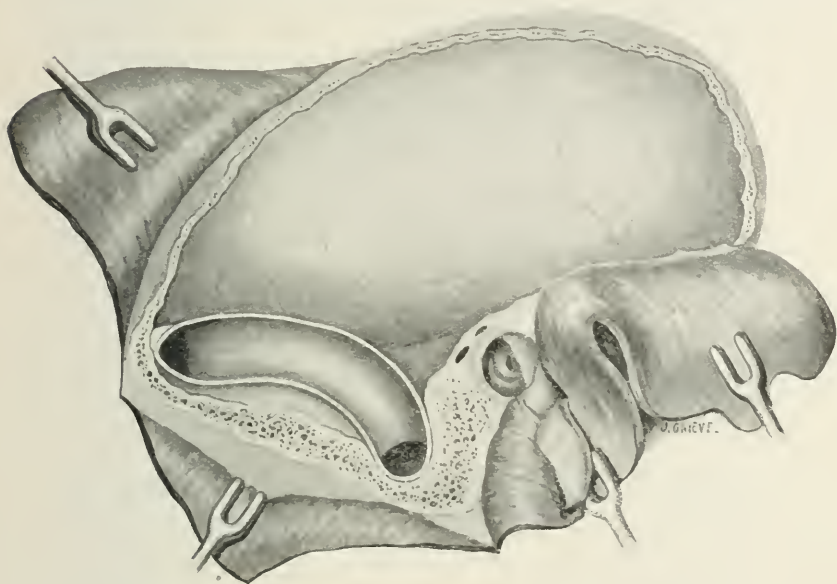


FIG. 1.—Case 1.—Shows the area of dura mater of the right temporo-sphenoidal lobe exposed by removal of bone. Behind and below this are seen the sigmoid sinus (with outer wall removed), and the operative openings into the right labyrinth.

forwards on the chest, though the patient complained that his neck was stiff. Kernig's sign indefinite. Other reflexes normal. Pointing test indefinite.

Operation, July 9, 1916, 5 p.m. No cortical erosion of mastoid. After a few taps with the gouge a large foul abscess was opened. Pus was seen to come from round the sinus and above it. About 2 oz. of pus were evacuated. The dura and sinus wall were covered with green sloughy granulations. The antrum was small and full of granulations and pus. No visible communication with the main abscess cavity. Outer wall of attic removed. Tegmen also removed, and more pus was discovered outside the dura. Radical mastoid operation completed and facial spur trimmed down. Prominence of external semicircular canal absent. Cold syringing produced no deviation of the eyes, but breathing became markedly slowed, probably due to cooling of brain, as a large surface of dura was exposed. Bone was now removed over a large area of middle fossa, exposing the abscess cavity, and also along the course of the sinus for about  $1\frac{1}{2}$  in. towards the torcular. The sinus was opened and found to be full of breaking down blood-clot. Some pus had formed in the centre of the clot. The edges of the sinus were clipped off and the clot scooped from the posterior end till free bleeding occurred. Posterior end of sinus





Wound dirty at the top, so operation decided upon. Eyes examined by Capt. Moxon, who found the discs normal.

*Second operation.*—Under chloroform the wound was opened up completely again. A gush of pus escaped from between dura and bone at the antero-superior corner of the wound when the dura was touched. Dura still very tense. No pulsation. Squamous temporal bone removed piecemeal to expose the whole of the abscess cavity till healthy dura was reached. To achieve this the incision in the soft tissues was prolonged upwards and forwards to the external angular process and then down to the zygoma. It was found necessary to remove practically all the bone of the temporal fossa down to the zygoma, as the abscess extended right down to the floor of middle fossa. All this exposed dura was covered with granulations. The labyrinth was next attacked, and Neumann's operation performed. All the bone behind the facial nerve was removed, including the superior and posterior canals. The external canal and the cochlea were also opened up. No cerebro-spinal fluid escaped. Lateral sinus exposed further forwards and downwards. Anterior end of wound stitched up. Fig. is not being reproduced.

July 13, 1916. Patient distinctly brighter this morning. Temperature and

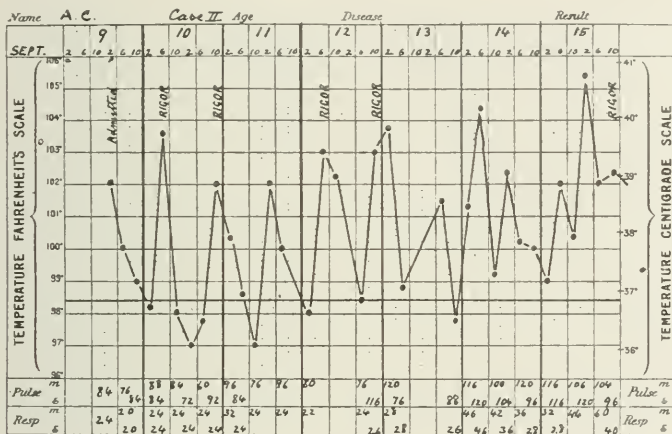


FIG. 4.

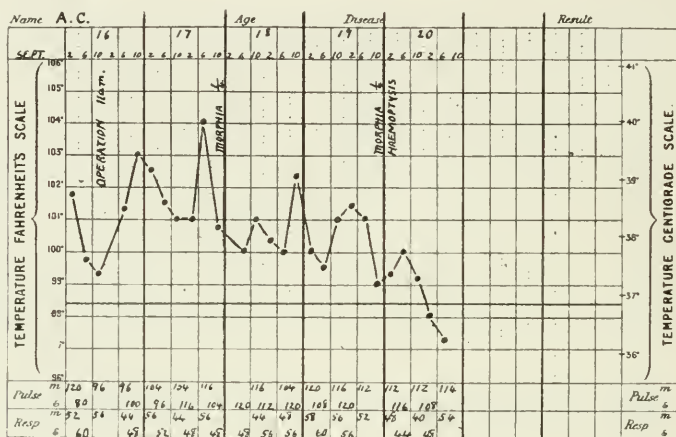
pulse still subnormal. Still a little drowsy. Dressed. Dura distinctly softer. No headache. Conjunctiva yellow. July 14, 1916: Slept well last night. Vomited this morning. Still has frontal headache. Still drowsy, and speaks very slowly. Dura a little more tense. July 15, 1916: No more vomiting. Feels better. Wound dirtier. Stitches removed from anterior end of wound and wound opened up again. Good deal of pus. July 17, 1916: Very well all yesterday. Dura beginning to granulate. Eyes again examined. Discs normal. Temperature rose to-day to 101° F. Patient obstinately constipated. July 18, 1916: Temperature still raised. Complains of severe pain in left arm. Wound clean. July 19, 1916: Severe pain in left axilla. After careful examination nothing found to account for it. July 21, 1916: Still pain in arm. Wound clean. Patient getting very thin. Vomited last night. July 22, 1916: A little better to-day. July 28, 1916: Improving, though pulse still subnormal. Needle put into temporo-sphenoidal lobe; no pus found. August 1, 1916: Edges of wound undercut and drawn together. August 17, 1916: Nearly all bone covered with granulations. Whole wound surface skin-grafted. September 2, 1916: Evacuated to England. September 16, 1916—Reported by postcard: Feeling very well. February 3, 1917—Report of Research Committee: Wound healed. Patient still has some headache; no other symptoms. Condition good.

Discharged from army.

CASE 2.—Gnr. A. C.—, aged twenty-five. Admitted to hospital, September 9, 1916, as a case of cerebro-spinal meningitis. History of severe pain in the right

ear and occipital headache since September 5, 1916. Patient collapsed on way to hospital. Had a rigor on September 9, 1916. Has had many since then. On admission had some pain and swelling behind the right ear. His neck was stiff and there was tenderness down the right side of the neck in the anterior triangle. Lumbar puncture was done. There were no organisms nor polymorphs in the fluid but Fehling solution was not reduced.

September 14, 1916. Patient complained of pain in the chest and began to cough up very foul greyish sputum. His colour became very bad. The blood had been examined three times for malaria parasites with negative result. Patient had had malaria two years before. He was seen by the writer on September 15 for the first time. He stated that he had had discharge from the right ear for many years. The discharge had been less lately. There was very little pain now in the ear. No mastoid tenderness but marked tenderness between mastoid and angle of jaw. There was some dryish foul pus in the right meatus. The right tympanic membrane showed a large posterior perforation with granulations showing through it. Left membrane apparently normal. Patient very deaf in the right ear but could hear raised voice with the noise-box in the left ear. Tenderness on pressing on the right sterno-mastoid about one



pulse became very weak. Given stimulants. Respirations still very rapid, averaging 56. Has had hiccup all afternoon and evening.

September 20, 1916. About 1.30 a.m. had a hæmoptysis. Brought up about an ounce of bright blood. Delirious all night.

September 21, 1916. Had another hæmoptysis in middle of night and died at 1.30 a.m.

*Post-mortem* examination showed a large amount of clear fluid in both pleural cavities. Both lungs adherent to the parietal pleura in places. Adhesions recent. At least seven septic infarets and gangrenous patches counted in the left lung. A large clot was shelled out from one of the cavities. The right lung contained eight distinct abscesses. The right side of the heart was dilated, the tricuspid orifice admitting five fingers. Large agonal clot in right auricle and ventricle. No hæmolytic changes in endocardium. Liver enlarged and showed acute congestion and some fatty change. Spleen acutely congested. Nothing to note in rest of body except that right lateral sinus was clotted on both sides of wound.

#### REMARKS.

In the first case the rise of temperature accompanied by acute pain in the left side and arm, which occurred on July 17, 1916, was very puzzling. Nothing could be found to account for it, and the patient became rapidly emaciated and looked as though he were going to die. The only explanation I have to offer is that he had a small infarct in his left lung. However, no physical signs could be detected.

Possibly also the fact that part of the sensory area of the brain on the opposite side was exposed may have had something to do with the pain.

The second case was very unfortunate in that he was not seen by a surgeon until long after septic infarction of the lungs had taken place.

My thanks are due to Lieut.-Colonel Waring for permission to record these cases.

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## WAR INJURIES AND NEUROSES OF OTOLOGICAL INTEREST.

By DR. C. E. JONES-PHILLIPSON,

Late Medical Officer in Charge, Ear, Throat, and Nose Department, Third Army No. 12 Stationary Hospital, British Expeditionary Force.

(Concluded from p. 82.)

### *Spontaneous Nystagmus.*

In the following seven cases giddiness and dizziness were complained of :

No. 23.—Rifleman F. J. S.—. This man has old losses of right and left membranæ tympani. He complained that gunfire caused extreme giddiness, followed by sweating and vomiting. He had a horizontal nystagmus on right and left sides. The rotatory and caloric tests showed a hyper-excitabile condition of the right and left labyrinths. The forks were not badly heard. Rinne was negative right and left for C<sub>2</sub>, and C<sub>4</sub> was normally heard right and left.

No. 47.—Pte. A. W.—. Deaf since a child; slept near the guns. The continual noise increased his deafness and caused buzzing noises and



giddiness. He had a horizontal nystagmus right and left. Tuning-forks  $C_1$  and  $C_4$  were shortened,  $C_2$  practically normal.

No. 48.—Pte. M. Y——. Had gunshot wound in right leg due to bomb explosion; deafness on left, straining noises, and giddiness. His membranæ tympani showed a condition of chronic dry catarrh. There was a rotatory nystagmus to the right. All the tuning-forks were shortened on the left; Weber to right.

No. 52.—Lieut. B. C. A——. High-explosive shell burst a few yards from him, over him but more towards his left; he was stunned. Deaf right and left, noises in the head, and pain for thirty-six hours. Both membranæ tympani were red. No sign of pre-existing disease. He has a spontaneous rotatory nystagmus to the left and horizontal nystagmus to the right. The rotatory and caloric tests showed a hypo-excitabile condition of the labyrinth on right and left, the response was only a feeble one. The tuning-forks for  $C_1$  and  $C_4$  were much shortened,  $C_2$ , although short, much less so, in comparison. At the end of a week the right and left nystagmus had gone,  $C_1$  and  $C_2$  were now very slightly shortened;  $C_4$  was still very short. The noises were much less, but present; giddiness had passed off.

No. 56.—Previously mentioned.

No. 78.—Lce.-Cpl. J. B——. A shell burst about four feet from him, made him light-headed, and deaf in both ears. Was very giddy. Deafness to a large extent passed off. There was a laceration in posterior quadrant and discharge of pus, which had come on since the explosion five days ago. There was a horizontal nystagmus to the right and left. The tuning-forks  $C_1$ ,  $C_2$ ,  $C_3$  were all heard better on the right; on the left they were all short. Weber lateralised to the right.

No. 83.—Pte. C. B——. Increased deafness, following the bursting of a shell twenty yards from him; previously deaf for years. There was a loss of membrana tympani in the left, and the membrane was red. The right membrana tympani was intact. Spontaneous horizontal nystagmus to right and left. The rotatory test to the left was normal; rotatory to the right, exaggerated response. Caloric to left normal; caloric to right, feeble response. All the forks were heard short on the left.

In the following cases the symptom giddiness was not complained of: two complained of feeling "dazed." In all a nystagmus was present. I regret in many instances I omitted to record whether a nystagmus was present. In "Experimental Physiology of the Semicircular Canals in the Dog-fish,"<sup>1</sup> the following statement appears: "Pressure on an ampulla causes movements of the eyes and fins such as would occur normally if the animal's body were rotated in the plane of the canal stimulated." Consider also the rotatory test, which is mechanical stimulation of the ampulla.

No. 40.—Pte. F. F——. Previously deaf, worse since he was blown up by trench mortar. Shrapnel wound of back. Feels dazed. Loss in right *nil*; ? laceration of left membrana tympani. There was horizontal nystagmus to right.

No. 41.—Pte. R. V——. Shell burst on parapet. He was dazed; had discharge, pain, and deafness on left; horizontal nystagmus to right. Tuning-fork  $C_4$  very short right and left.

No. 42.—Cpl. L. Y——. Trench mortar burst on top of the trench, causing deafness, noises in the left ear, and bleeding. There is an intra-

<sup>1</sup> Lee, *Journ. Phys.*, 1903, xv, p. 328.

membranous clot at left umbo. Horizontal nystagmus right and left, more marked to right.

No. 43.—Pte. T. B——. Shock due to the bursting of a premature. Caused deafness right and left and buzzing. There was rotatory nystagmus to the right. Tuning-forks, not much loss.

No. 44.—Pioneer J. S——. Always deaf; C.D.C. changes. Guns make him worse by bringing on buzzing noises which are much worse in left ear. Horizontal nystagmus to left.

*Analysis of Shell Concussion Effects on the Internal Ear.*

The membrana tympani is of much greater area than that of the fenestra ovalis. The ossicles convey the vibrations from the large area to the small; much greater force must therefore be applied to the small area. We should expect different effects on the internal ear if the full force has been transmitted to the fenestra ovalis, the membrana tympani having withstood the force of concussion, and a less effect if the membrana tympani has been lacerated, much of the force being lost; and in cases of otitis media suppurativa with large losses, where the remains of the membrana tympani and the diseased condition of the contents of the middle ear have been much minimised in value as transmitters. I shall select cases falling into the three classes, and then consider the effects.

*(A) Membrana Tympani remained intact.*

No. 85.—K——. Deafness, left most, right less; following Delville Wood; quite right before, never had discharge from ears. Has noises like "engines" in left ear now. No evidence of pre-existing disease.

		R.		L.
C <sub>1</sub>	... ..	Nil A.C. or B.C.	...	Nil A.C. or B.C.
C <sub>2</sub>	... ..	— short	...	Nil
C <sub>4</sub>	... ..	Short	...	Nil
Rotatory test	...	Feeble and slow	...	Nil
Caloric test	...	Feeble	...	Nil
Weber to	...	Weber	...	

No. 86.—B——. Buried by shell; no previous trouble. Deafness, dizziness, and noises followed.

		R.		L.
C <sub>1</sub>	... ..	Nil	...	Nil
C <sub>2</sub>	... ..	— short	...	Nil
C <sub>4</sub>	... ..	Short	...	Nil
Rotatory test	...	Very slow, long excursion	...	Very slow, long excursion
Caloric test	...	Nil	...	Nil
Weber to	...	Weber	...	

No. 73.—W——. Was firing 12 in. howitzer from Dainville Station; had been on large gun fire before. On this occasion the howitzer was in a cutting, two sides of which were closed in.

		R.		L.
C <sub>1</sub>	... ..	+	...	+
C <sub>2</sub>	... ..	+	...	+
C <sub>4</sub>	... ..	Very short	...	Very short
Rotatory test	...	Normal	...	Normal
Caloric test	...	Normal	...	Normal
		Weber	...	

*Vide* Nos. 52 and 42 previously mentioned.

No. 64.—B——. Following Mametz Wood. Deafness right and left, singing noises; previous c. d. c.

	R.	L.
C <sub>1</sub> ... ..	+ short	+ short
C <sub>2</sub> ... ..	+ short	+ short
C <sub>3</sub> ... ..	Very short	Very short
Rotatory test	Normal	Normal
Caloric test	Normal	Normal

Weber does not lateralise.

No. 54.—B——. Was buried. Deafness right and left at first, right passed off in seven or eight hours; was dumb for three hours; giddy, and straining noises. No previous existing disease. There was a blood spot in the left superior quadrant.

	R.	L.
C <sub>1</sub> ... ..	+	— short
C <sub>2</sub> ... ..	+	Neutral
C <sub>3</sub> ... ..	Good	Very short
Rotatory test	Normal	Normal
Caloric test	Normal	Normal

(B) *Membrana Tympani Lacerated.*

No. 49.—McG——. Shell burst a few yards from him, injuring the left side of face, jaw, and eye, and causing deafness, giddiness, pain, buzzing, and discharge of blood in left. There was a laceration at left umbo and hæmorrhage in the attic region. Right intra-membranous clot at umbo and small blood spots.

	R.	L.
C <sub>1</sub> ... ..	Neutral	—
C <sub>2</sub> ... ..	—	— short
C <sub>3</sub> ... ..	Heard well	Heard short
	Weber	
Rotatory test	Feeble	Feeble
Caloric test	Feeble	Feeble

No. 55.—F——. Trench mortar fell and exploded on top of parapet; caused deafness right and left. No previous disease. There was a blood streak down the handle of the malleus on the left, and the membrana tympani was lacerated at the anterior inferior quadrant.

	R.	L.
C <sub>1</sub> ... ..	—	—
C <sub>2</sub> ... ..	— very short	— very short
C <sub>3</sub> ... ..	Very short	Very short
Weber	Nil	Nil
Rotatory test	Feeble	Feeble
Caloric test	Feeble	Feeble

*Vide* No. 56 previously mentioned.

No. 59.—Lieut. P——. Trench mortar fell on trench and burst two yards from him. Pre-existing disease *nil*. Deafness, left. The left membrana tympani was very red and lacerated at anterior inferior quadrant; discharge of muco-pus, blood-stained.

	R.	L.
C <sub>1</sub> ... ..	Felt only	Felt only
C <sub>2</sub> ... ..	+	— very short
C <sub>3</sub> ... ..	Heard only	Heard very short
Weber		Weber
Rotatory test	Normal	Very exaggerated normal
Caloric test	Not performed	Not performed

*Vide* No. 60 previously mentioned.

No. 63.—M——. A shell burst at the back of him and he was blown into the air. Deafness right and left, unconscious one and a half hours; continuous headache, hissing noises; right improved, not left. Pre-existing c. d. c. Left membrana tympani lacerated at inferior quadrant.

		R.		L.
C <sub>1</sub>	...	+	...	— short
C <sub>2</sub>	...	+	...	— short
C <sub>4</sub>	...	Heard well	...	Very short
Weber	...	Weber to	...	
Rotatory test	...	Normal	...	Feeble
Caloric test	...	Normal	...	Feeble

No. 65.—P——. Heavy guns, fired whilst he was in a communication trench, caused deafness and noises, and discharge from left ear due to laceration in upper quadrants.

		R.		L.
C <sub>1</sub>	...	— very short	...	— short
C <sub>2</sub>	...	— very short	...	— short
C <sub>4</sub>	...	Very short	...	Short
Weber	...	Weber	...	
Rotatory test	...	Feeble	...	Feeble
Caloric test	...	Feeble	...	Feeble

No. 74.—E. S——. Big shell exploded a few feet off; wounds of hands followed by left deafness, blood from left, hissing noises, discharge two days later. There was general redness of left membrana tympani and a laceration at anterior inferior quadrant.

		R.		L.
C <sub>1</sub>	...	+	...	—
C <sub>2</sub>	...	+	...	— short
C <sub>4</sub>	...	Normal	...	Very short
Rotatory test	...	Exaggerated	...	Feeble
Caloric test	...		...	

(c) *Membrana Tympani Previously Lost,*

No. 11.—S——. Shell burst near him, fifteen yards off. Always deaf right and left, deafness much increased by the explosion. ? Congenital syphilis.

		R.		L.
C <sub>2</sub>	...	Nil	...	Nil
C <sub>4</sub>	...	Nil	...	Nil
Rotatory test	...	Normal	...	Normal
Caloric test	...	Normal	...	Normal

No. 23.—Previously mentioned.

No. 28.—B——. Aerial torpedo burst on parados, buried him; deafness, right and left, noises, inability to walk. Right ear got better.

		R.		L.
C <sub>2</sub>	...	+ short	...	+ short
Weber	...	Weber	...	
Bone conduction over left mastoid heard in right ear <i>only</i> .				
Rotatory test	...	Exaggerated	...	Exaggerated
Caloric test	...	Exaggerated	...	Exaggerated

No. 47.—*Vide* previously reported.

No. 75.—B——. Trench mortar shell burst and he was struck by mud; face and scalp injuries. Deafness in left, discharge after three days; singing in left, blood in throat. Pre-existing old losses right and



left, recent slit in posterior superior quadrant, left, and a hæmorrhage in posterior superior quadrant, right.

		R.		L.
C <sub>1</sub> ... ..	...	—	...	— short
C <sub>2</sub> ... ..	...	—	...	— short
C <sub>4</sub> ... ..	...	Heard well	...	Short
Weber test	...	Weber to	...	
Rotatory test	...	Normal	...	Normal
Caloric test	...	Normal	...	Feeble

No. 83.—*Vide* previously reported.

Class A : In only two cases (85 and 86) of the 100 examined was there total inability to hear tuning-forks C<sub>1</sub>, C<sub>2</sub>, C<sub>4</sub>; in these cases also there was practically no response to caloric tests, and there was peculiarity of the nystagmus to rotatory tests, showing some marked derangement. No. 85 required a full quart of *hot* water to produce reaction, which was then feeble and slow. No. 86 required nearly as much additional turning to produce a reaction which was then of extreme excursion, the eyes moving to their full limits—internally and externally—and very slow. Effect of explosion fairly equal on right and left, and C<sub>4</sub> most affected.

In Class B there was never total inability to hear C<sub>1</sub>, C<sub>2</sub>, and C<sub>4</sub>, and only feeble response to rotatory and caloric tests, except in a couple of cases where rotatory and caloric tests gave much exaggerated response.

In Class C there was never total inability to hear C<sub>1</sub>, C<sub>2</sub>, and C<sub>4</sub>, except in No. 11, and I am inclined to think he was a case of otitis interna syphilitica, deprived of his small amount of hearing by the explosion, and the response to rotatory and caloric tests was more often normal than otherwise, although excitation and depression were seen.

Taking the cases collectively the forks C<sub>1</sub>, C<sub>2</sub>, C<sub>4</sub> are generally shortened on the side most affected, or equally on right and left if both have been equally exposed. The tone area for C<sub>4</sub> is certainly the most affected. There is at times marked shortening for C<sub>1</sub> and C<sub>4</sub> in comparison with C<sub>2</sub>. Again, C<sub>1</sub> and C<sub>2</sub> may be normally heard and C<sub>4</sub> at very short distance. Weber lateralises to the side least affected, and though both right and left were seriously disorganised in Nos. 85 and 86, there was lateralisation to the side on which the forks were still faintly and shortly audible. In No. 73, Weber C<sub>2</sub> lateralised to a side—the sides having equal acuity. In No. 59, Weber lateralised to a side—very defective although the opposite side was normal. On performance of Weber test with the two forks C<sub>1</sub> and C<sub>2</sub>—in some cases the former would lateralise to one side and the latter to the other, or C<sub>1</sub> would lateralise and C<sub>2</sub> not do so—and *vice versa*.

Caloric tests : Very much more water, either hot or cold, was required in performing the labyrinth tests as compared with amount usually required for functioning in normal cases. Two quarts and more had often to be used before a response was noticed. The nystagmus varied very much, but it was definitely present in every case except Nos. 85 and 86. It was often very quick and feeble, this was the common one—or very slow and feeble—in one case the nystagmus was so coarse in its movements, I can only compare them to the movements of the pendulum of a big clock, slow with long excursions. In a few cases the nystagmus was quickly induced and very violent. In these cases the patient looked deadly pale, with extreme giddiness, faintness, and vomiting; in two the

effect was so prolonged the cases were unable to return to their ward for fifteen to twenty minutes.

The rotatory and caloric tests corresponded in their effects except in a very few instances, notably No. 83.

It is evident that certain parts of the organ of Corti are often more seriously damaged than others, and that the labyrinth may be rendered hypo—or hyper—excitable. Anyway, its normal equilibrium is much altered. It is evident that most effect on the internal ear is produced through an intact membrane, and one which stands the force of the explosion; also that the effect is less when the membrana tympani lacerates, and still less in the conditions of previous loss of membrana tympani.

### *Causation and Prognosis.*

Shell-concussion deafness is probably due to three contributory factors:

- (1) Cerebral concussion.
- (2) Overstrain and fatigue of the organ of Corti; the former being due to violent oscillations of the perilymph communicated to the organ of Corti, and the latter to continuous violent noises or explosions at close quarters.
- (3) Temporary or permanent disorganisation of the conductive apparatus.

The prognosis depends on the recovery of these parts.

(1) The patient experienced a great shock, and was, in many instances, buried. He became suddenly deaf, and often dumb also. In other cases, he could not see, or had paresis of arm, leg, or both legs. Here the higher centres were temporarily involved. One watched the almost sudden improvement in hearing in a few days as shock passed off, and the disappearance of nervous symptoms generally when the patient was removed from the firing line.

(2) A portion of deafness remains to be more or less slowly recovered from by the return of the internal ear to a normal or nearly normal condition.

(3) Structural damage must leave a permanent imperfection of function—a ruptured membrane; a dislocation, partial or complete, of the small bones from one another, or the stretching of their attachments to the tympanic wall.

These, in other larger but similar conditions, are only slowly recovered from, if ever, in many instances. I am able to quote from cases seen three or four months later, showing a great recovery of hearing. The loss in these cases was practically due to the macroscopic structural damage, and the frequent sequela, chronic otitis media suppurativa, but from the information gained from the cases I have seen, I believe that shell-concussion deafness is, to a large extent, temporary and curable.

## THE RESULTS OF A SERIES OF INVESTIGATIONS BASED ON EXAMINATION OF 110 INDIVIDUALS WITH REGARD TO THE TIME OF COMMENCEMENT AND DURATION OF NYSTAGMUS IN THE CALORIC TEST.

By C. A. SWAN, M.B.Oxon, and R. LAKE, F.R.C.S.

IN view of the uncertainty as to the values of different observers' work on the above test, the following abstracts from a report made by us and sent to the Air Board on April 19, 1917, may be of interest and assist in forming a standard method of testing. We will omit all matters not germane to the subject of this note. Our tests were made on 110 healthy individuals, mostly cadets (80), all of the individuals tested being men passed fit for all duties: General service.

In order to keep all examinations alike we used 7 oz. (100 c.c.) of water at 60° F. The time for the water to flow out of the irrigator was 60 sec. The test showed a wide range, but an average was obtained, giving the onset of the first visible movement of the eye, based on 41 instances, averaged 50 sec; the total duration of the nystagmus, 37 sec.; and out of the whole 110 instances the time from the commencement of irrigation to that of cessation of the nystagmus was 96 sec., a difference of 9 sec. in the two series of observations.

We considered that there seemed to be no constant duration of the nystagmus and no constant time of onset, and that in health these times varied in different individuals. A further fact was that in 13 instances no nystagmus was obtained under the given conditions, but usually in these cases vertigo was severe on attempted movement. This shows, we think, that 60° F. is not cold enough, and 55° F. would be better.

We also had a fair amount of evidence to prove that in the neurasthenic conditions, induced by a long period of scouting and fighting, etc., that a prolongation of the normal duration of the induced nystagmus was present, one case showing a period of 75 sec. nystagmus after being sent home, which sank to 25 sec. after two months genuine rest.

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## CLINICAL NOTE.

### MEDICATION OF THE MIDDLE EAR, PER TUBAM.

By DAN MCKENZIE.

LIKE Mr. Mark Hovell, and, I suppose, most other otologists, it has always seemed to me that we do not yet take full advantage of the Eustachian route to the middle ear when we wish to treat disease of that cavity. I am not sure, however, whether Mr. Mark Hovell does in fact aim at reaching the tympanum, as he has expressed himself pleased with the results of colossol argentinum applied *as a spray* around the Eustachian orifice.

My efforts, on the other hand, have always been directed to reaching the tympanic cavity with my medicaments, and if one uses an oily liquid of fair density and a Eustachian catheter of wide calibre it is possible in most patients to blow the liquid up the tube as far as the middle ear. Nay, more, it is possible actually to deliver a column of liquid, as such, into the tympanic cavity, although, I must admit, such a considerable achievement I always regard as a lucky shot.

I have tried a very large number of remedies, such as silver nitrate in watery solution after the application of cocaine, but that produces severe pain after the action of the cocaine has passed off, with sero-mucous effusion into the tympanum, and cannot be recommended. Then I tried to get a dense vehicle which would carry zinc chloride, but did not succeed, while to use zinc oleate in an oily liquid was open to the serious objection that that salt of zinc has no astringent action locally.

Another plan I tried was that of blowing up a cloud of ammonium chloride, which I succeeded in doing by placing Messrs. Burroughs, Wellcome's small ammonium chloride inhaler, *en suite* with the Eustachian catheter. But its action was too transitory to be of any real service.

Finally, the ingenuity of Messrs. Allen & Hanbury's chemists in providing an oily solution of iodine for use as a nasal spray gave me a hint I quickly took advantage of, and I concocted a solution with their help which I have found to be of quite considerable value in the treatment of chronic catarrh of the middle ear, especially of the exudative variety.

The following is the formula I have been using now in hospital and private practice for the last three or four years:

R. Iodin. resublimat.	. . . . .	gr. ii to iv.
Ol. sassafras	. . . . .	℥ i.
Menthol	. . . . .	gr. iii to v.
Camphor	. . . . .	gr. iii to v.
Ol. eucalypt.	. . . . .	℥ iii.
Paraff. liq.	. . . . .	ad. 5 i.

The quantity of iodine varies with the case; some do better with the stronger and some with the weaker strength. But I make it a rule to employ the strongest whenever possible. The inflation and injection should be made not less often than once a week.

I am guided both as to the strength of the application and as to its frequency by the patient's feelings. If used too strong or too frequently a peculiar ache is produced in the ear. This I have always looked upon as an indication to moderate the treatment, but it is possible that I have erred on the side of caution, since I have never yet seen any sign of reaction in a reddening of the membrane, save, of course, that which one is accustomed to see immediately after the injection is made.

That the liquid reaches the ear cavity proper is evident in the fact that a certain amount of pain in the mastoid region, what we might call the "mastoid sensation" may be produced. And this is quite usual when ol. caryophyll. is one of the ingredients of the mixture. Clove oil, indeed, causes so much pain that it should not be used in greater strength than ℥ i to the ounce. But the pain it causes is very evanescent, lasting only about five minutes.

Experimenting upon oneself it is possible to distinguish three distinct sensations, and these I have named the Eustachian sensation, the tympanic sensation, and the mastoid sensation.

The first is felt when menthol is used, during the passage of the liquid into the Eustachian tube, the peculiar cool tingling of menthol being then felt in the cheek and lips of the same side. The tympanic sensation is felt in the area where one gets earache, and also in the external meatus and sometimes even in the auricle and mastoid. The mastoid sensation is seldom felt with menthol alone, but often when clove oil is used. The iodine does not seem to give rise to any sensory



stimulus in the strengths I use it, unless, as I have already said, it is too strongly or frequently applied, and then a reactionary discomfort ensues which lasts from a few hours to a day or two.

In conclusion, I should like to say that I do not claim a great deal for this formula, but patients certainly do appreciate some benefit from its use, as they frequently come and ask for another application if they have been without it for some time, and many of them say that they hear better, and, above all, that the "full feeling" in the ears disappears after its use.

The liquid, by the way, may be looked upon as sterile. Liquid paraffin contains no bacterial pabulum and the iodine and essential oils used are antiseptics of known value.

It is wise to warm the liquid before injecting it, but care must be taken not to have it too hot.

## Abstracts.

### PHARYNX.

**Tonsillectomy in Diphtheria Carriers.**—C. C. Ballantyne and B. S. Cornell. "Brit. Med. Journ.," November 24, 1917.

Persistent treatment of those carriers having failed to eliminate the germ, tonsillectomy was performed. In four of six cases the bacilli were found in the very depths of the crypts, where surface applications could not be expected to reach them.

The authors conclude: (1) That in apparently normal individuals the *Bacillus diphtherie* may be harboured in the depths of the tonsillar crypts. (2) That complete enucleation of the tonsils seems to be a successful means for eliminating diphtheria organisms from carriers, although it appears too drastic a measure for routine adoption.

*Douglas Guthrie.*

**Vincent's Angina among the Troops in France.**—R. J. C. Douty. "Brit. Med. Journ.," November 24, 1917.

The writer draws attention to a marked increase in the number of cases of Vincent's angina among the troops in France, and notes in particular the possible complications, such as nephritis, endocarditis, gastro-enteritis, etc., which may render it a serious disease. Those complications are more liable to accompany the chronic and severe type, which lasts for several weeks.

The tonsil is the part generally affected in Vincent's agina, though the ulceration may spread to the uvula, soft palate, or pharyngeal wall. In one case seen by the author the uvula was almost entirely destroyed.

*Douglas Guthrie.*

**Tonsillar Infections of the Cavernous Sinus.**—Got. "Rev. de Laryng., d'Otol., et de Rhinol.," July 15, 1917

The usual focus is an infection in the facial region. Otitic cases may occur owing to an infection by the superior or inferior petrosal sinus, without any demonstrable phlebitis of the lateral sinus. Of cases due to a tonsillar infection the authors can find only two, which they describe in

detail. The anatomical routes of infection as described by the author work out as follows: Up to a certain point there is only one route, which then divides so as to provide two alternatives. Thus, the infection travels by the tonsillar plexus to the pterygo-palatine veins, and so to the pterygoid plexus. From here it can travel either: (1) With the blood-stream, through the nasopalatine, nasal, and angular veins to the cavernous sinus; or (2) against the stream (we know that such retrograde phlebitis can occur, as in the lateral sinus) by the veins through the foramina ovale and rotundum, direct to the cavernous sinus.

*Treatment.*—This is still nearly hopeless. The chief interest, in this monograph, lies in the routes suggested for surgical approach. Briefly these are: (1) *Via* the zygomatic and temporal fossæ, and trephining the great sphenoidal wing (as in the Hartley-Krause approach to the Gasserian ganglion, plus a temporary resection of the malar bone, which is turned downwards.—Trans.).

(2) By displacing the eyeball outwards and resecting the inner orbital wall, also the ethmoidal and sphenoidal cells.

Drainage is made from the nose, unless the eye has been destroyed, in which case the sinus is drained by the orbit.

The author prefers the latter route.

*H. Lawson Whale.*

## NOSE.

**Operations on the Nasal Sinuses carried out through a Temporary Opening in the Septum (Trans-septal).—Norman Patterson.**

"Brit. Med. Journ.," October 20, 1917.

"No one can have failed to remark the excellent display of the opposite side of the nose revealed through a large septal perforation."

Taking advantage of this fact, the author advises the adoption of the trans-septal route in operations on the nasal sinuses. The direct view thus obtained is of greatest advantage in dealing with the ethmoidal cells, but operations on the frontal and sphenoidal sinuses and on the antrum are also facilitated.

The temporary opening in the septum may be made in various ways. Best of all is the preliminary performance of a submucous resection. Ten days later an oblique incision is carried through the united layers of the muco-perichondrium, and the opposite ethmoidal region is then examined and treated with the aid of a long-bladed speculum. The incision through the septum is then sutured, and heals readily without any resulting perforation.

If the operation must be completed at a single sitting, a quadrilateral flap, comprising the whole thickness of the septum, is turned aside, or submucous resection may be performed, followed by incision through the intact side. Careful approximation and suture of the mucous membrane is important.

*Douglas Guthrie.*

**Head Colds from the Standpoint of the Internist: Their Results and Treatment.—T. F. Reilly (New York). "Amer. Journ. Med. Sci.," May, 1917.**

The writer draws attention to the considerable economic loss occasioned by "head colds," and refers to the results of an inquiry instituted by the Boston Board of Commerce, which disclosed the fact that one-half of the population of Boston suffer from a cold during six months of the year,

and that one-fifth of the population are absent from work all of the time as a result. He himself investigated a series of post-operative pneumonias at the Harlem Hospital and found that in every instance the anæsthetist or attending nurse was suffering from an infectious rhinitis. A common sequela of head cold, occurring from the fourth to the eighth day is an attack of muscular pain and soreness, variously denominated lumbago, stiff neck, pleurodynia, or muscular rheumatism, and sometimes nerves, such as the sciatic or brachial, are affected, and a true neuritis follows. Indeed, most cases of so-called muscular rheumatism will be found to follow within a week or two of a head cold. Although quinine is so frequently employed in the treatment of colds, there is no agent which so frequently congests the mucous membrane of the upper air-passages. The writer has never seen any good, and often harm, from its use.

*Thomas Guthrie.*

**Familial Epistaxis: A Case Report.**—H. B. Richardson (Boston).  
"Amer. Journ. Med. Sci.," July, 1917.

Osler in 1901 described a "family form of recurring epistaxis, associated with multiple telangiectases of the skin and mucous membranes," and since then a number of instances of the condition have been reported. In the present paper detailed accounts are given of the history and physical examination of two cases of the diseases occurring in father and son.

*Thomas Guthrie.*

## EAR.

**The Technique of Examination of the Static Labyrinth.**—Isaac H. Jones and Lewis Fisher. "Annals of Otology, etc.," xxvi, p. 1.

An exhaustive paper, dealing with the complete investigation of the static labyrinth. Under spontaneous phenomena, it deals in some detail with nystagmus, vertigo, pointing, falling, turning, to be carried out after noting the physical signs of the organ of hearing, the hearing function, and the fistula test. They then proceed to turning tests, dealing with nystagmus after turning, vertigo after turning, post-pointing after turning, and falling after turning. The caloric and electrical tests follow. The paper contains a special recording chart.

*Macleod Yearsley.*

**Tuberculous Mastoiditis—Radical Operation under Cocaine Anæsthesia.**  
—Harold Hays. "Annals of Otology," xxvi, p. 110.

Man, aged twenty-four. General anæsthesia was avoided in case it should light up quiescent lung trouble. The practical points deduced by the author from the case are: (1) That the radical mastoid operation can be done under local anæsthesia without any pain. (2) That the superficial scalp tissues and periosteum are sensitive, but the bone has absolutely no sensation. (3) That the mucosa of the middle ear is extremely sensitive and must be separately cocaineised. (4) That irritation or destruction of the facial nerve is immediately noticeable to the patient. (5) That the after-effects are practically nil. (6) That the end result is just as good under local as general anæsthesia.

*Macleod Yearsley.*

**Results in Four Cases of a Modified Radical Operation for Chronic Purulent Otitis Media.**—H. B. Blackwell. "Annals of Otolology," xxvi, p. 121.

In the first two cases the superior portion of the epitympanic ring of bone was removed; in the last two the ring was left in position. All were cases of chronic running ears. Three are now dry, and in three the hearing has improved. In dressing it is most important to prevent a thick plug of granulations from developing in the attic and antral regions. It is better to remove all plugging at the end of a week.

*Macleod Yearsley.*

**An Analytic Study of the Rinne and other Tuning-fork Tests.**—J. W. Downey. "Annals of Otolology," xxvi, p. 31.

At the outset it must be noted that the author pays the German Rinne too great a compliment by according him an acute accent and so naturalising him as a Frenchman. The paper is a long one and is a preliminary communication. The first part is thus summarised: (1) By both air and bone conduction it is necessary that we have some index which will indicate the intensity under which a tuning-fork is heard, and the simplest way to attain a factor of this description is by comparing the abnormal duration of perception with the normal duration of perception and taking the difference between the two as the significant indicator. (2) As the energy necessary to make a tuning-fork heard by bone conduction is markedly greater than the energy necessary by air conduction, the normal duration of perception of each is different: therefore, we may not directly compare the one with the other, but we must make separate tests of each course of sound conveyance.

The author considers that by the use of three forks—C 128, C<sub>2</sub> 512, and C<sub>5</sub> 4096—the useful range of hearing may be covered, and his routine examination is: (1) Usher's test. (2) Schwabach's test for C<sub>2</sub> with one ear cut off by a noise apparatus. (3) The duration of perception for C<sub>2</sub> by air conduction as compared with the normal. (5) The duration of C<sub>5</sub> by air as compared with the normal. All trials are timed with a stop-watch. All these tests are described in particular detail, for which the reader is referred to the original.

*Macleod Yearsley.*

## MISCELLANEOUS.

**The Rational Treatment of Stuttering.**—Mrs. May Kirk Scripture and Eugene Jackson. "The Laryngoscope," February, 1917, p. 74.

The writers remark that probably no human affliction has been more exploited by heartless charlatans than stuttering. Stutterers are taught to speak in an unnatural voice, to use sing-song or very loud tones, and so on. They have been taught to speak beating time with the arm or nodding the head, or to clench the fist on difficult sounds, for the sake of distraction. Such schemes never relieve a stutterer of anything but his money, though, in some of the methods enumerated, there are things of value.

The fundamental aim of the teacher should be to cure the pupil of his pernicious speech habits by showing him the correct habits of speech, which include proper posture, respiration, articulation, phonation, fluency, and thinking. Every pupil should be carefully examined for organic



defects in the organs of speech and for nerve troubles. The personal and family history of every case should be investigated. The actual correction of the speech defect is largely pedagogic, and falls within the realm of the properly trained speech teacher. It requires time and infinite patience on the part of the pupil and teacher.

*Posture.*—The chest should be held so that the air may be freely inhaled and exhaled, and the head should be at right angles with the body. When sitting the pupil should not slide down in the seat nor bend forward, but sit up straight with his back resting comfortably against the back of the seat. Above all things, the pupil should be perfectly relaxed.

*Breathing.*—Breathing exercises for stutterers are of two kinds: (1) Deep breathing for increasing the lung capacity, and (2) exercises for breath control in speaking. It does not matter which of the numberless good deep-breathing exercises are used so long as they are properly performed. After the patients have learned the speaking-breath, they should sound a vowel on the outgoing breath, and hold it as long as the breath lasts without straining, etc.

*Phonation.*—Most stutterers phonate improperly. Their voices lack flexibility, and they speak in a monotonous manner. Singing scales, arpeggios, and songs, exercises in speaking and reading, with special attention to intonation and melody, lead to good results.

*Articulation.*—Pupils should be taught the exact position of the speech organs for each vowel and consonant. Each sound should be drilled first by itself, then in words, and finally in sentences. The vowel is the most important part of every word, and must be lengthened and strengthened.

*Fluency and Thinking.*—The stutterer soon learns to read and repeat sentences with smoothness and facility. When, however, he has to speak spontaneously, he quickly reverts to his old habit. This is due to fear that he will not speak correctly. He must therefore be convinced that he can speak properly. At first the stutterer should read and repeat sentences, together with other pupils, and then alone. The next step is the reading of sentences in which words are to be supplied, etc. Then comes the answering of simple questions, and finally, the retelling of stories and argumentation. Exercises in rhythm are most valuable in obtaining fluency of speech, proceeding from rhythm in music to rhythm in poetry.

*Results Attainable.*—It is not possible to cure every stutterer, but, if properly treated early enough, most cases can be permanently cured, and all cases alleviated. Young children yield easily to treatment, as they have not acquired the mental attitude of the adult stutterer. After progress has been made in the class-room, the teacher should take his pupil out upon the street, and get him to ask "passers-by" or policemen the way to certain places. Under the teacher's supervision the pupil should telephone and order things in stores so that he may acquire the ability to speak properly in all situations.

J. S. Fraser.

## REVIEWS.

*Les Blessures du Cerveau.* By CHARLES CHATELIN. Second edition. Pp. 198. Masson & Cie. 4 francs.

This book embodies the experience of the neurologists of the famous Salpêtrière Hospital. Most of their clinical material consisted of cases

which had been wounded at least several days before and many of which had already had surgical treatment. Many ideas regarding cerebral localisation, which before the war were merely surmised, have now been definitely confirmed by the study of localised injuries to parts of the brain. A whole chapter is devoted to the subject of aphasia. It is now fairly certain that the centre for language is not situated in the third frontal convolution but in the zone of Wernicke, *i.e.* the gyrus supra-marginalis, gyr. angularis, the posterior end of the first two temporal convolutions, and the subjacent white matter, extending as far as the descending horn of the lateral ventricle.

A large section of the book is devoted to the cerebellum, and a full description of methods of localisation and diagnosis is given. This region is always of great interest to the otologist, and the matter is put so lucidly and succinctly in this book that it is well worth the while of any aural surgeon to procure and study closely the methods here presented.

J. K. Milne Dickie.

*Eye, Ear, and Throat Hospital for Shropshire and North Wales, 1818-1918.*

The celebration of the centenary of this hospital has been made the occasion of the production of a small *brochure* giving a brief review of the history of the institution, which has grown to be one of the best known, as it is one of the most beautiful special hospitals in the west.

We trust that it may long be preserved to carry on its good work in Shrewsbury under the efficient surgical management of our colleagues—Mr. Russ Wood, and his junior, Dr. F. A. Anderson.

Dan McKenzie.

*Three Clinical Studies in Tuberculous Predisposition.* By W. C. RIVERS, M.R.C.S., D.P.H. London: George Allen & Unwin, Ltd. 1917.

Mr. Rivers, in this closely-reasoned book, sets out to prove a connection between "consumption and ichthyosis": "consumption and squint"; "consumption and nasal abnormality." The last is the *pièce de resistance*, occupying over 200 of his 272 pages.

The author finds nasal abnormality to be commoner in phthisical than in healthy people in the proportion of 68 per cent. to 36 per cent. In the course of his discussion he has a good deal to say about the connection between ozæna and tuberculosis, and about the work on the subject which recently appeared in this Journal, utilising the data given in that endeavour in a manner very astonishing to one at least of the authors of "Ozæna and Tuberculosis."

To be quite plain, we cannot agree with any of the conclusions he arrives at because his arrangement of the data shows bias. Inconvenient elements are ignored. Like the fair May Colvin, of ballad fame, and like many other more reputable people, Mr. Rivers "has taken the red and has left the white"; he "has taken the best and has left the worst," and "so lightly has tripped away."

And the consequence realises expectation. A case is described in the book, the physical signs of which were noted as "query harsh breath sounds at the left apex. She showed great drooping of the right half of the shoulder girdle. . . . The right scapular angle was some inches lower than the left one. Also there was slight narrowing of the right

apical isthmus of resonance. *Coinciding as these did with squint, the case was clearly one of consumption.*" (Italics ours.)

The author adds that such a case was one of a type likely to do well in a sanatorium.

Dan McKenzie.

## OBITUARY.

WILLIAM LAIDLAW PURVES, M.D.(Edin.),  
Consulting Aural Surgeon, Guy's Hospital, London.

WILLIAM LAIDLAW PURVES, who has recently passed from among us, did not mix in the otological world as much as could have been wished. This was much to be regretted, as those who knew him were convinced that his influence could only have been a powerful and good one. Among his friends he was a fearless and downright opponent of anything which he thought a deviation in the slightest degree from absolute scientific accuracy; he had no sympathy with that interested credulity which leads to the adoption of practices which are beneficial to the practitioner quite as much as to the patient, nor with such publication of opinions and results as savours less of information than of self-advertisement. His views were somewhat severe, but his own standard was a very high one, and he commanded the confidence and esteem of all with the warm regard of those by whom he was best known and understood. Had he not shrunk from publicity and ostentation his place would have been one of the most prominent and none would have better deserved to occupy it.

He was a native of Edinburgh, where he went through both his school and University career. His earlier professional years were spent in practice in Australia, but he returned to Edinburgh to graduate as Doctor of Medicine. He continued his studies at Berlin, Vienna, Paris and particularly at Utrecht under the instruction of Prof. Donders, of that University. He then settled in London and was appointed Lecturer and Aural Surgeon to Guy's Hospital in 1874, an appointment which involved his having a Diploma of the Royal College of Surgeons of England, and he was the last to obtain this on the strength of the *ad eundem* rights of those holding diplomas from other colleges of surgeons.

In the earlier part of his career in London he was an industrious student of the current literature of otology, and his "abstracts" from German articles were of great value at a time when abstracting was in the hands of a very few. His own writings were not numerous, but of great value, and it is regrettable that there were not more of them. A paper on Rinne's test in a far-back number of *Guy's Hospital Reports* was in its time a valuable addition to otology. In Bryant's *Surgery* the section on "Diseases of the Ear" was from his pen, and when we realise the amount of information on the subject which he compressed into the limited space we can only regret that he did not allow himself the scope which a full treatise on otology would have afforded him. He was a zealous student of the refraction and diseases of the eye, and, indeed, had not circumstances led him to adopt otology as a career we believe he would have thrown himself with still greater joy into the practice of ophthalmology. He worked up elaborate tables and a slide-rule for the calculation of refraction figures at the time when the transition from fractional focal distances to metrical dioptries was taking place, and

Purves's refraction ophthalmoscope held the field as the instrument *de luxe*.

The writer is indebted to him for many kindnesses, and among others for instruction as to the value of the artificial drum and the method of applying it to the best advantage, as well as other refinements of otology and otoscopy of importance in dealing with the ear as an organ of hearing, which have fallen in interest since the brilliancy of the surgery of suppurative disease of the ear has put them so much in the shade.

A man of vigorous frame, he enjoyed the *mens sana in corpore sano*, and devoted what time he could spare from his work to outdoor physical exercise. In the golfing world he was highly esteemed both as an exponent and a promoter of the game.

He had reached the age of seventy-five when he died, having enjoyed the pleasures of an active physical life and with the appearance of youthfulness more than falls to the lot of most men.

His family by his second marriage (he had no children by his first) are models of physical fitness, one of his sons having been an international football player for Scotland, and all have served their country in the present war. One of them has found his last rest near the shores of Lake Doiran.

D. G.

## NOTES AND QUERIES.

### THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

At an informal meeting recently gathered under the auspices of the President of the Laryngological Section of the Royal Society of Medicine the topic of the position of our Journal was brought forward, and an interesting discussion took place, which left all present more than ever animated with the desire to keep this particular flag of British Otolaryngology flying.

Many suggestions were offered, and the proceedings as a whole were full of animation and the warm desire to help.

Some doubt was expressed, among other points raised, as to whether authors writing oto-laryngological papers in journals of general medicine were allowed to send their own or "authors'" abstracts to our Journal. We have much pleasure in saying that abstracts of this kind are always welcome.

It was suggested also that the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY should publish a short *précis* of each meeting of the Otological and Laryngological Sections of the Royal Society of Medicine, shortly after the meeting, *in addition* to the official reports, which cannot, of course, appear for several months after each meeting. This we hope to do in future.

Several voices were raised in favour of opening our columns to the discussion of points of practical importance, such as the details of treatment, medical or operative.

This also we welcome, and we extend an invitation to all our subscribers to make the fullest use possible of the Journal in this matter.

Dr. Brown Kelly's proposal in the interesting Presidential Address before his Section when the present Session opened, that once a year a scientific meeting of British laryngologists should be held, at which papers could be read, was alluded to and warmly supported by many present.



Before the war this side of the work was undertaken at the Annual Meeting of the British Medical Association, but, although interesting and pleasant, those occasions did not, we fear, touch high-water mark in scientific value, whereas a meeting under our own control would, we venture to say, stimulate scientific production in Britain. We hope the plan will succeed.

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#### AMPUTATION OF PHARYNGEAL ENDS OF EUSTACHIAN TUBES.

In using the La Force adenotome lately I made, inadvertently, a clean amputation of the prominent ends of the Eustachian tubes of both sides, including a portion of the cartilage which I recognised in the specimen.

The accident troubled my mind a little, but it need not have done so, as the wounds have healed well and the Eustachian orifices now only look as if they were normal, as they appear to endoscopic examination.

The amputation was known occasionally to occur when using the old adenoid curette, but I am not aware that it has hitherto been reported as occurring when the adenotome is used. And yet the latter instrument, shaving the surface with a sharp-bladed knife from below upwards, is very liable to effect the amputation, particularly when one lateralises the instrument to secure the Rosenmüller group of adenoids.

It is possible that the accident is less serious than was at one time supposed, but it is too early yet to say whether the above case is going to suffer any damage to the ears, for example.—DAN MCKENZIE.

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#### COCAINE-ADRENALINE AS PRELIMINARY TO GENERAL ANÆSTHETIC IN TONSILLECTOMY.

In adults, when the tonsils are to be removed by dissection under a general anæsthetic, there is usually a good deal of inconvenient and time-consuming gagging and retching whenever the patient emerges from the deeper stages of anæsthesia.

I have found that this can be overcome to a great extent and the operation rendered more placid if the fauces, tonsils, posterior pharyngeal wall, and glosso-epiglottic fossæ are painted over once, just before the general anæsthetic is commenced, with equal quantities of sol. cocain hydrochlor. (10 per cent.) and sol. adrenalin (1-1000).

Painted thus on the surface only there is no likelihood of the adrenalin inducing troublesome reactionary hæmorrhage.—DAN MCKENZIE.

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#### L'OTO-RHINO-LARYNGOLOGIE INTERNATIONALE.

After a hiatus caused by the war, the above journal has resumed publication. We are pleased to be able to record the fact and we wish it every success.

THE  
JOURNAL OF LARYNGOLOGY,  
RHINOLOGY AND OTOTOLOGY.

*Original Articles are accepted on the condition that they have not previously been published elsewhere.*

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**INTRINSIC CANCER OF THE LARYNX AND THE OPERATION  
OF LARYNGO-FISSURE,**

**WITH A DESCRIPTION OF SOME NEW INSTRUMENTS SPECIALLY  
DESIGNED FOR IMPROVING THE TECHNIQUE.**

BY IRWIN MOORE, M.B., C.M.EDIN.,

Surgeon to the Throat Hospital, Golden Square, London, W.

INTRODUCTORY.

CANCER of the larynx is comparatively rare in comparison with its occurrence in other organs of the body, though it occurs more frequently in this situation than in the naso-pharynx and pharynx combined.

The returns of the Registrar-General for the years 1901-09 show an increase of cancer during this period, irregularly distributed over the various organs of the body. In males the main increase fell upon the alimentary tract, and especially upon the stomach. The increased mortality mainly affected the higher age periods. This apparently shows that the increase in cancer is partly due to the general increase in longevity (Sampson Handley).<sup>1</sup>

There is evidence that malignant disease is on the increase—not only apparent but a real one, and not dependent on increase of average of life.

The returns of the Registrar-General for England and Wales (1910-15) show that the total number of deaths from cancer in 1915 amounted to 39,847 compared with 35,902 in 1911.

According to the mortality returns of this country, in every hundred cancer deaths 21 are stomach to 1·8 larynx, whilst American returns show that 43 are stomach to 1 larynx (Roger Williams).<sup>2</sup>

In the seventieth report for England and Wales (1910) we find that the average total number of deaths from laryngeal cancer per year on a 10 years' average (1901-10) amounts to 334, whilst the seventy-fifth

<sup>1</sup> Sampson Handley, "Cancer Mortality," "Med. Annual," 1912, p. 195.

<sup>2</sup> Cited by Scanes Spicer, "Proc. Roy. Soc. Med.," 1910, iv (Laryngol. Sect.), p. 20.

report (1915) shows that the yearly average for the 5 years (1911-15) has increased to 534.

Many primary pharynx cancers were probably included under the heading extrinsic larynx cancers, and this refers also, in all probability, to subsequently quoted statistics.

Gürdt<sup>1</sup> (Berlin) stated in 1880 that out of 11,131 cases of carcinoma recorded in three large hospitals he only found it 63 times in the larynx, or 1 in 176, compared with 47 in the air tract above.

Semon,<sup>2</sup> in 1899, gathered the statistics of all laryngeal growths, amounting, all told, to 10,747 non-malignant cases and 1550 malignant cases—1 in 7 being malignant.

Epithelioma is the most frequent growth in the larynx, and is generally a primary affection.

Bosworth<sup>3</sup> (New York), prior to 1900, collected 334 cases, of which 204 were carcinomata and 130 sarcomata. This is not in agreement with modern statistics, for sarcoma is considered rare in this position.

Ziemssen<sup>4</sup> (Munich) reported 57 epitheliomata in 68 malignant cases, of which 9 were sarcomata.

Massei<sup>5</sup> (Naples), in tabulating 500 cases of laryngeal neoplasm, mentions having met with epithelioma in 67, and sarcoma in 10.

Since carcinoma and sarcoma are usually indistinguishable clinically, it is unnecessary to consider them separately.

The *etiology* of cancer of the larynx, as in other parts of the body, is still unsolved.

It is interesting to note, however, that a large number of cases are reported in which the patient was addicted both to alcohol, and especially to smoking, with their accompanying local irritation; also others in which the voice was over-strained or overworked.

Chiari<sup>6</sup> (Vienna) has expressed the opinion with great reserve that "continued irritation of the mucosa of the larynx, *e.g.* by excessive drinking and smoking, recurring catarrhs, syphilis, and finally, heredity, are to be considered as probable causes of cancer of the larynx.

StClair Thomson<sup>7</sup> considers that such predisposing causes have been blamed without sufficient justification.

Chevalier Jackson<sup>8</sup> (Pittsburg) says we cannot ignore the influence of chronic laryngitis as at least a predisposing cause of cancer of the larynx, and that specific ulcerations and benign growths can prepare a soil more favourable than normal tissues for the invasion of cancer.

There seems little doubt that specific lesions may supply the local irritation which favours the occurrence of epithelioma, as shown by cases reported, and the occurrence of malignancy following syphilis may cause great difficulty in diagnosis.

Ludin<sup>9</sup> (Petersburg) reports a case where the epithelioma was growing out from a syphilitic cicatrix.

<sup>1</sup> *Arch. für Klin. Chir.*, 1880, xxv, p. 426; also cited by Price-Brown, "Dis. Nose and Throat," 1st edit., 1901, p. 437.

<sup>2</sup> Cited by Ballenger, "Dis. Nose and Throat," 1st edit., 1908, p. 525.

<sup>3</sup> Cited by Ballenger, *op. cit.*, p. 525.

<sup>4</sup> *Ibid.*, *op. cit.*, p. 525.

<sup>5</sup> Cited by Shurley, "Dis. of Throat and Nose," 1st edit., 1900, p. 572.

<sup>6</sup> "Proc. Amer. Laryngol., Rhinol., and Otol. Soc.," 1909, p. 3. Abstract, *Laryngoscope*, 1909, xix, p. 955.

<sup>7</sup> "Dis. of Throat and Nose," 2nd edit., 1916, p. 485.

<sup>8</sup> "Peroral Endoscopy and Laryngeal Surgery," 1915, p. 647.

<sup>9</sup> *Petersb. Med. Woch.*, No. 17, 1899. Abstract, *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1899, xiv, p. 432.

Keimer<sup>1</sup> (Dusseldorf) refers to two cases of carcinoma following gumma of the larynx in patients who took alcohol excessively, smoked heavily, and used their voice excessively.

That carcinoma is to some extent hereditary is alleged to have been shown by clinical evidence<sup>2</sup> and investigations.<sup>3</sup> According to Leslie Davis<sup>4</sup>, hereditary history can only be obtained in less than 10 per cent. of cases.

Ledoux-Lebard<sup>5</sup> (Paris) states that out of 42 patients with cancer, 7 had a family history of cancer, *i. e.* 16.6 per cent.

#### SEX.

Malignant tumours of the larynx especially affect the male sex to the extent of about 90 per cent.

In Butlin's<sup>6</sup> 50 collected cases, already referred to, 40 were males, and but 10 females.

Semon,<sup>7</sup> out of 212 cases of malignant disease of the larynx seen in his private practice in 25 years from 1878 to 1906, found that 177 occurred in men and only 35 in women.

In Gürlt's<sup>8</sup> 63 cases—51 were males and 12 females.

Goris<sup>9</sup> (Brussels) collected 62 cases, and found that out of these 55 occurred in men, 3 in women, and in 4 the sex was not stated.

*Age.*—They are rarely met with under 40 years of age, most frequently between 50 and 60, and not infrequently between 40 and 50.

Semon's<sup>10</sup> experience with regard to age—stated in 1894—was that the 30 years of life between 40 and 70 furnished the majority of all cases of malignant disease of the larynx, and from 1894 to 1906 he found that more cases occurred in the decade between 60 and 70 than in that between 50 and 60.

The earliest case on record was reported by Rehn<sup>11</sup> (Frankfurt); it was a child, aged three, with epithelioma of the larynx, which had existed for two years.

McBride<sup>12</sup> records a case in a girl, aged twenty-four; Garel<sup>13</sup> (Lyons) in a girl, aged eighteen; and Chiari<sup>14</sup> in a girl, aged sixteen.

St. Clair Thomson<sup>15</sup> has reported two early cases of epithelioma of the larynx in patients (both males), aged respectively twenty-three and twenty-eight.

<sup>1</sup> *Monatschrift für Ohrenheilkunde*, Feb., 1890. Abstract, *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1899, xiv, p. 431.

<sup>2</sup> Williams, Roger, "The Natural History of Cancer," 1908, p. 356.

<sup>3</sup> Murray, J. A., "Scientific Report of Imperial Cancer Research," 1911, iv, p. 114.

<sup>4</sup> *Laryngoscope*, 1908, xviii, p. 372.

<sup>5</sup> *Rev. de Méd.*, Dec. 10, 1908; also quoted by Sampson Handley, "Med. Ann.," 1910, p. 204.

<sup>6</sup> "Malignant Diseases of the Larynx," 1883, p. 31.

<sup>7</sup> "Trans. Med. Soc. Lond.," 1907, xxx, p. 126.

<sup>8</sup> Quoted by Price-Brown, "Dis. of Nose and Throat," 1901, p. 437.

<sup>9</sup> *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1900, xv, p. 505.

<sup>10</sup> "Trans. Med. Soc. Lond.," 1907, xxx, p. 126.

<sup>11</sup> "Virchow's Archiv.," 1868, xliii, p. 129; cited by Bosworth, "Dis. Nose and Throat," 1892, ii, p. 749.

<sup>12</sup> *Med. Chronicle*, Feb., 1896, p. 339.

<sup>13</sup> *Ann. des Mal. de l'Oreille*, 1903, xxix, p. 377.

<sup>14</sup> H. Marschik, *Monats. f. Ohrenheilk.*, 1909, 43 Jahr.

<sup>15</sup> "Proc. Roy. Soc. Med.," 1911, iv, p. 119; also 1912, v (Laryngol. Sect.), pp. 4 and 93; *ibid.*, 1912, v, p. 151; also 1913, vi, p. 16; *JOURN. OF LARYNGOL., RHINOL. AND OTOL.*, 1913, xxviii, p. 204.



Females rarely suffer from cancer of the interior of the larynx; when they do exhibit cancer it is usually primary in the pharynx, and spreads to the larynx by continuity, and is then misleadingly recorded in the returns as extrinsic laryngeal cancer (William Hill).<sup>1</sup>

#### CLASSIFICATION OF LARYNGEAL CANCER.

Krishaber<sup>2</sup> (Paris) divided malignant growths of the larynx into two groups according to the anatomical site of origin of the disease, viz. *intrinsic*—those arising from the cavity of the larynx, *i. e.* the true and false vocal cords, the ventricles, and the subglottic space. *Extrinsic*—those arising from other parts of the laryngeal mucosa, *i. e.* the inter-arytænoid space, the aryepiglottic folds, the epiglottis, and the pharyngeal side of the larynx, which is, of course, a primary pharyngeal growth and not laryngeal in origin. In the same sense growths commencing on the pharyngeal side of the aryepiglottic folds and arytenoids and in the pyriform fossæ are pharyngeal in origin and only laryngeal by extension, and are wrongly recorded in returns. *Mixed*—*i. e.* a combination of extrinsic and intrinsic.

Semon referred to the so-called intrinsic form as originating from what he termed the *true* interior of the larynx, viz. from the ventricular band downwards, and these are the only true laryngeal cancers, *i. e.* primary in origin.

The intrinsic form, *i. e.* true intra-laryngeal cancer, remains longer a purely local affection, and not till the disease is much advanced are the neighbouring lymphatic glands infected, owing to its location within a cartilaginous box from which the lymphatics have an attenuated connection with the glands in the neck.

In the extrinsic form—those arising, *i. e.* primary outside the larynx, but afterwards invading it from the pharynx, gland infection appears, as a rule, in the early stage, and we more frequently get present metastases (Otto Stein).

William Hill<sup>3</sup> has called attention to Krishaber's classification as unsatisfactory and confusing, in so far that no cancer arising in the larynx can anatomically be described as extrinsic in origin, though it may become so later by extension; for all primary laryngeal carcinomata are endo-laryngeal in origin, and also at first in situation. He suggests that it would be more correct to divide them into:

(1) *Circumglottic Area Laryngeal Cancers*.—Growths which are wholly endo-laryngeal in origin and remaining long intrinsic.

(2) *Party-wall Cancers*.—Rapidly invading growths, including those of intra-laryngeal, *i. e.* intrinsic origin arising from the margin of the larynx and those of extra-laryngeal, *i. e.* of pharyngeal origin, and subsequently invading the larynx.

It is generally admitted, however, that for the purpose of differentiating those true endo-laryngeal cancers, so long as they remain intrinsic and suitable for operation, by laryngo-fissure, from those which are laryngo-pharyngeal, the essential distinction which Krishaber had in mind is all that can be desired.

Fraenkel's classification as modified by Moritz Schmidt<sup>4</sup> (Frankfort), is a guide to the morphological varieties met with:

<sup>1</sup> Personal communication to author.

<sup>2</sup> *Gaz. hebdom.*, 1879, xvi, p. 518.

<sup>3</sup> "Proc. Roy. Soc. Med.," 1909, ii (Laryngol. Sect.), p. 3.

<sup>4</sup> Quoted by Otto Stein, *Laryngoscope*, 1907, xvii, p. 269.

- (1) The polypoid form on the vocal cord resembling a fibroma.
- (2) The diffuse form on the vocal cord presenting a thickened irregular or nodular surface.
- (3) Either of the above forms, or a combination of the two, situated elsewhere than on the vocal cords, and resembles more often a cauliflower-like growth.
- (4) The ventricular form.
- (5) That form the origin of which is deep-seated.

Whilst cancer is very rare in women, the few cases which do occur in them are almost always of the extrinsic variety (Semon).

Semon's<sup>1</sup> statistics of 212 cases of malignant disease between 1878 and 1906 showed that 136 were intrinsic and 76 extrinsic or mixed, also that the proportion of extrinsic and intrinsic cases were practically the reverse in the two sexes, viz. 124 of intrinsic and 53 of extrinsic in men against 12 cases of intrinsic and 23 extrinsic in women.

Chevalier Jackson's<sup>2</sup> statistics show that the more hopeful form, viz. intrinsic, is more frequent in the proportion of 98 to 43.

St. Clair Thomson<sup>3</sup> has only performed thyro-fissure for epithelioma of the larynx in two females in comparison with thirty males.

Primary endo-laryngeal cancer may originate at any point within the larynx, but is rarely infra-glottic in origin. It tends to grow parallel to the long axis of the cord and involve it to a large extent before encroaching on other parts.

Previous to the investigations of Semon,<sup>4</sup> it had been assumed by writers that malignant disease comparatively rarely began in the vocal cords, but his experience showed that the cords were the parts most likely to be affected.

Paul Bruns<sup>5</sup> (Berlin) collected 1100 cases of laryngeal neoplasms, of which 836 were on the vocal cords.

Schmiegelow<sup>6</sup> (Copenhagen) also found that out of 66 cases of intra-laryngeal cancer—at least 36 cases originated from the vocal cords.

Butlin<sup>7</sup> found out of 50 cases of laryngeal cancer, that only 3 were infra-glottic.

Fauvel's<sup>8</sup> (Paris) statistics quoted by Wright show that out of 300 cases of laryngeal neoplasms collected only 9 were subglottic.

Shurley<sup>9</sup> (Detroit) has only met with 4 subglottic cases (subglottic in origin is probably meant) out of a total of 50.

St. Clair Thomson<sup>10</sup> found from the record of his first 10 cases of thyro-fissure for intrinsic cancer that the ages varied from 43 to 68. Five, or 50 per cent., were under 50, 4 were between 50 and 60, and 1 was nearly 70.

Reports of cases demonstrate that intrinsic cancer may be situated on the surface of the cord and be confined to only a small portion, or it may invade a whole cord or ventricular band, or a diffuse deep infiltration may be present, which may only slowly approach the surface, or else having commenced on the anterior or middle third of one vocal cord it may

<sup>1</sup> "Trans. Med. Soc. Lond.," 1907, xxx, p. 126.

<sup>2</sup> *Laryngoscope*, 1909, xix, p. 587.

<sup>3</sup> "Proc. Roy. Soc. Med.," 1917, xi (Laryngol. Sect.), p. 14.

<sup>4</sup> The Semon Lectures: P. McBride on "Semon's Work on Malignant Disease of the Larynx," *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1913, xxviii, p. 179.

<sup>5</sup> Cited by Shurley, "Dis. of Throat and Nose," 1900, p. 564.

<sup>6</sup> *Lancet*, 1914, ii, p. 300.

<sup>7</sup> Quoted by Shurley, "Dis. of Throat and Nose," 1900, p. 572.

<sup>8</sup> *Ibid.*, p. 564.

<sup>9</sup> *Ibid.*, p. 564.

<sup>10</sup> *Brit. Med. Journ.*, 1912, i, p. 358.

extend to the anterior commissure and even invade the opposite cord, or, again, it may be found to have spread down into the subglottic space, or backwards to the posterior wall of the larynx. Secondary disease of the opposite cord may occasionally occur by auto-infection.

*Infection by Contact.*—Shattock<sup>1</sup> says carcinoma is conveyable by contact to only a limited extent.

A few cases are recorded in which a malignant growth on one vocal cord was supposed to have infected the opposite cord. Such cases have been reported by Newman,<sup>2</sup> Butlin and Semon,<sup>3</sup> Middlemass Hunt.<sup>4</sup>

It is generally taught that intrinsic malignant disease of the larynx is most commonly situated on the posterior third of the vocal cord, and extends posteriorly and has a special preference for the posterior commissure, but experience during recent years has shown that the middle or anterior third is the favourite site, and that extension is more common along the anterior portion of the cord to the anterior commissure. This is confirmed by reference to cases reported by Semon,<sup>5</sup> StClair Thomson,<sup>6</sup> Tilley,<sup>7</sup> Jobson Horne,<sup>8</sup> Middlemass Hunt,<sup>9</sup> Barclay Barron,<sup>10</sup> Mollison,<sup>11</sup> Chichele Nourse,<sup>12</sup> Hett,<sup>13</sup> Cathcart,<sup>14</sup> and others.

Some varieties of intrinsic cancer remain superficially limited for a long time, in their earlier stages, to one cord or ventricular band, and show no tendency or only a slow tendency to spread, this slow progress being seen chiefly in people of advanced age. It would appear that this occurs in certain epitheliomata with a preponderance of the fibrous element—probably the result of inflammatory reaction, Nature's first line of defence.

Clinical evidence suggests that there are various degrees of malignancy in epitheliomata, for in many cases a benign or feebly malignant clinical course may follow even when there is direct microscopical evidence of malignancy, whilst in others the growth may be of a rapid and highly malignant character.

Harmon Smith<sup>15</sup> (New York) reports a case of laryngeal carcinoma where the malignant character was of such a low order that it ran a benign course for thirteen years before it became actively developed.

Duvivier<sup>16</sup> (Paris) reported a case where the larynx was completely invaded by cancer. There was no trace of the vocal cords five months after the first appearance of symptoms and death, and there was entire absence of secondary growths.

<sup>1</sup> Shattock and Dudgeon, "Wound Infection in Carcinoma," "Proc. Roy. Soc. Med.," 1915, viii (Path. Sect.), p. 63.

<sup>2</sup> "Trans. Clin. Soc. Lond.," xxii, p. 101.

<sup>3</sup> *Brit. Med. Journ.*, 1888, i, p. 96. Shattock, "Trans. Path. Soc.," 1888, xxix, p. 36.

<sup>4</sup> "Proc. Roy. Soc. Med.," 1910, iii (Laryngol. Sect.), p. 34.

<sup>5</sup> *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1899, xiv, p. 130.

<sup>6</sup> "Trans. Amer. Laryngol. Assoc.," 1914, p. 34.

<sup>7</sup> *Brit. Med. Journ.*, 1898, ii, p. 1218. Abstract, *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1899, xiv, p. 48.

<sup>8</sup> *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1901, xvi, p. 283.

<sup>9</sup> *Ibid.*, 1899, xiv, p. 14.

<sup>10</sup> *Ibid.*, 1899, xiv, p. 5.

<sup>11</sup> "Proc. Roy. Soc. Med.," 1915, viii (Laryngol. Sect.), p. 97.

<sup>12</sup> *Ibid.*, 1910, iii, p. 143.

<sup>13</sup> *Ibid.*, 1912, v, p. 154.

<sup>14</sup> By private communication to author. The notes of this case appeared in the agenda of the meeting of the Laryngological Section, Royal Society of Medicine, on December 7th, 1917, but were not published in the Proceedings, since the patient was unable to attend the meeting.

<sup>15</sup> *Laryngoscope*, 1910, xx, p. 139.

<sup>16</sup> *L'Echo Méd. du Nord*, April 29, 1900. Abstract, *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1900, xv, p. 444.

Lennox Browne<sup>1</sup> suggested that the cause of such quiescence was probably to be found in the purely intrinsic nature of the disease, and the consequent absence of lymphatic infection, but this does not explain why some malignant growths in this position are more benign than others.

*The Question of the Transformation of Benign Laryngeal Growths into Malignant, especially in Connection with Laryngeal Operations.*—Semon<sup>2</sup> carried out important investigations in connection with this question, and reported in 1899 that out of 10,747 benign growths in 8216 cases (of which 3382 were papillomata) the growth was removed by intra-laryngeal operations, into 480 recurrences of the papillomata. Out of the whole number (10,747) that were at first benign, 45 became malignant whilst under observation, and of these 33 after intra-laryngeal operation. Degeneration occurred in 12 instances out of 2531 benign growths, in which no operation had been performed, so that the percentage of transformation was actually greater in the cases that were not interfered with intra-laryngeally than in those on whom operations were carried out.

#### DIAGNOSIS OF MALIGNANT DISEASE.

Impaired mobility of the affected vocal cord to which Semon<sup>3</sup> first drew attention, when present, is a valuable sign. It has been said to be pathognomonic of cancer of the vocal cord area, but this sign is not always present, and Semon did not assert that it was, for mobility is usually observed in surface growths in which only superficial infiltration has taken place. Impaired mobility is probably present in 50 per cent. of cases. The occurrence of immobility shows that the disease is more extensive than the mirror view of the growth would suggest, and that it has infiltrated deeply, and encroached on the intrinsic muscles, thus interfering with their action and with the free mobility of the crico-arytenoid articulation. This sign, which has been more exactly described as a "lagging" or "lazy" action of the vocal cord, when associated with hoarseness, should always arouse one's suspicions and awaken watchfulness (Leslie Davis).<sup>4</sup> In any case, mobility does not exclude a diagnosis of malignancy.

The diagnosis in the majority of cases should depend mainly on naked-eye appearances and on exclusion of other possibilities such as tuberculosis, syphilis, etc. John Nolan Mackenzie<sup>5</sup> (Baltimore) says it is impossible to exaggerate the importance of naked-eye diagnosis in the detection of laryngeal cancer. Great assistance may also be obtained in some cases by direct laryngoscopy in ascertaining the extent of the disease.

Most epitheliomata of the interior of the larynx are in their early history superficial growths, but there are a few alleged exceptions which are believed to originate in the deep-seated tissues close to the perichondrium and do not approach the surface until a late stage of the disease. Such cancers occasionally give origin to a true papillomatous proliferation on the surface of the mucosa and closely resemble a perichondritis throughout the whole duration of the disease, so that the appearance is

<sup>1</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1899, xiv, p. 179.

<sup>2</sup> *Internat. Centralblatt für Laryngologie*, 1889. Quoted by Barclay Barron, 'Year Book of Treatment,' 1891, p. 441.

<sup>3</sup> "Trans. Clin. Soc. Lond.," xx, p. 46.

<sup>4</sup> *Laryngoscope*, 1908, xviii, p. 378.

<sup>5</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1900, xv, p. 525.



very often masked by the superadded symptom. If a portion of such a growth is removed endo-laryngeally for microscopical examination—unless the piece be large and deeply punched out, the result of the examination may prove misleading.

In these cases a granuloma may frequently be seen by the laryngoscopic mirror in the anterior commissure which suggests that perichondritis of the thyroid cartilage exists.

"Cancer of the ventricle of Morgagni very much resembles internal perichondritis of the thyroid cartilage" (Moritz Schmidt).<sup>1</sup>

*Hoarseness.*—A thorough laryngoscopic examination should always be made in all cases in which hoarseness persists, since alteration of the voice may be the earliest and only symptom of malignant disease. Chronic hoarseness in the aged is the most trustworthy early warning of possible malignancy, and may vary from a few months to some years.

Navratil<sup>2</sup> (Pesth) reports a case of carcinoma of the larynx in which there was a history of hoarseness of ten years' duration. The growth at the end of that time was an ulcerated uneven mass as big as a walnut and involved the false and true cords. It was sharply marked off from the surrounding tissues, and there was no enlargement of glands.

*Infiltration*, persistent in character, is another strong clinical evidence of malignancy—many of these infiltrations have no sharp line of demarcation, but blend imperceptibly with the surrounding structures (Leslie Davis).<sup>3</sup>

Laryngeal cancer may not only simulate tuberculosis, but also syphilis.

It is best to exclude, if possible, tuberculosis before thinking of syphilis or cancer (Jobson Horne).

From tuberculosis it may generally be differentiated by the history, age, location, character of onset, and mode of development—together with evidence of disease in the lungs. From syphilitic gumma by the sudden appearance of the gummatous lesion, by its rapid development, and tendency to ulcerate and break down. There may also be a history of infection and the Wassermann test may be positive.

Obscure cases exist where there is the co-existence of two different diseases such as cancer and syphilis, or cancer and tuberculosis. The appearance of malignancy in such cases known to have had tuberculosis or syphilis may be very misleading (see Otto J. Stein's admirable article on the diagnosis between tuberculosis and syphilis, etc., in the *Laryngoscope*, 1907, xvii, p. 270).

In forming an opinion as to the nature of the infiltration we should remember that:

*Chronic laryngitis* presents a bilateral hyperæmia and thickening.

*Pachydermic laryngitis* is a symmetrical affection located upon the vocal processes, an unusual site for malignant lesions.

*Benign growths*, as a rule, have no infiltration like the malignant ones, and grow towards the lumen and not into the tissues.

Otto Stein<sup>4</sup> (Chicago) has summarised the forms of malignant lesions which present great difficulties in diagnosis:

(1) A cancer arising deep in the tissues and presenting a vegetating mass of proliferating tissue that has the appearance of a papilloma.

<sup>1</sup> "The Diagnosis of Laryngeal Cancer," JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1900, xv, p. 503.

<sup>2</sup> JOURN. LARYNGOL., RHINOL., AND OTOL., 1900, xv, p. 324.

<sup>3</sup> *Laryngoscope*, 1908, xviii, p. 378.

<sup>4</sup> *Laryngoscope*, 1907, xvii, p. 270.

(2) A round, smooth mass, situated in the ventricle of Morgagni, which may look like a perichondritis.

(3) A small malignant mass, situated deeply beneath the cords, and there may be some paresis present.

#### ENDO-LARYNGEAL REMOVAL OF A PORTION FOR MICROSCOPICAL EXAMINATION.

Difficulty in the diagnosis of certain cases of epitheliomata of the vocal cord may justify the removal of a piece through the natural passages for microscopical examination, but punching out a piece of the growth, if malignant, only stimulates and hastens the rapid increase and spread of the neoplastic area from the cord to the deeper structures, and the piece examined not having been removed deep enough may show no signs of malignancy, and no conclusion can be arrived at. Again, removal of a piece at once exposes the patient to the danger of auto-infection or metastasis. If the growth is of such a shape that the section could be punched out through the whole thickness, this procedure is permissible (Delavan). To be certain, we must see in the sections epithelial cells, groups, or columns where one should not meet them. The irregular structure and arrangement of epithelium such as we find in these groups, is the characteristic feature of cancer (Fletcher). It is seldom, however, possible to obtain a satisfactory specimen by means of forceps passed through the mouth, for the endo-laryngeal forceps do not remove the base from which the growth springs. It is wiser to perform thyro-fissure early in a case where malignant disease is not absolutely established, as by this means the extent and nature of the disease can be accurately determined by naked-eye appearance and palpation, than to allow the case to progress until malignancy is absolutely certain and probably extended deeply (William Lincoln).<sup>1</sup>

Otto Stein<sup>2</sup> forms the following conclusions: "A negative find in a case clinically suspicious, or a suspicious case that cannot be disproved should not, after explaining the matter to the patient, deter one from performing a thyro-fissure, even though it be but exploratory; carefully and skilfully performed there can follow no harm."

#### THE OPERATION OF LARYNGO-FISSURE.

The brilliant results obtained during recent years by the operation of thyro-fissure in cases of early cancer of the interior of the larynx, more especially in the vocal cord area, have brought this comparatively old operation more prominently to notice.

An anterior median vertical fissure of the larynx may include fissure of the thyroid or cricoid cartilages, or of both. Fissure of the cricoid alone is probably a very rare procedure. In the treatment of chronic inflammatory stenosis of the larynx a full laryngo-fissure through the thyroid and cricoid cartilages is always performed, and usually the incision extends through some rings of the trachea, thus constituting a laryngo-tracheostomy or tracheo-laryngostomy. In operations for malignant disease, and in very exceptional forms of non-malignant disease, the lesser form of laryngo-fissure—i.e. thyro-fissure—is the operation

<sup>1</sup> Discussion on Delavan's paper, "Recent Advances in the Treatment of Malignant Disease of the Larynx," "Trans. Amer. Laryngol. Assoc.," 1904, p. 170.

<sup>2</sup> *Laryngoscope*, 1907, xvii, p. 271.

of choice, the cricoid being left intact. This shorter form of laryngo-fissure is frequently alluded to as thyrotomy, and that nomenclature was not only employed by Butlin and Semon in recording their numerous cases, but their example has been largely followed by specialists and general surgeons all over the world.

Thyrotomy as a term is not free from ambiguity, however, and does not differentiate between incising the thyroid gland and the thyroid cartilage. The same criticism in a lesser degree applies to thyro-fissure. Timothy Holmes,<sup>1</sup> in 1882, suggested it might be better termed "chondro-laryngotomy" or "total laryngotomy."

Durham<sup>2</sup>, in 1883, expressed his opinion that the term "thyrotomy" is more applicable to cutting operations on the thyroid gland, and suggested that any operation in which section of one or other or both of the larger laryngeal cartilages is made should be termed "laryngo-chondrotomy." For the sake of clearness, Tilley<sup>3</sup> has both spoken and written of thyro-chondrotomy instead of thyrotomy. Hill,<sup>4</sup> in discussion, has suggested that laryngo-fissure should be retained for the full incision where both cartilages are fissured (which is occasionally necessary in cases of considerable subglottic extension of the lesion), and thyro-chondro-fissure adopted for the shorter form of laryngo-fissure.

In the title of this communication I have employed the term "laryngo-fissure" in its old comprehensive sense as including both the longer and shorter incisions. The body of the paper is largely concerned with the lesser variety of laryngo-fissure, and this I have alluded to as thyro-fissure, considering it less ambiguous than thyrotomy and a sufficiently well-understood term.

#### HISTORY AND STATISTICAL RESULTS OF THE OPERATION OF LARYNGO-FISSURE.

The operation of dividing the larynx by section of the cartilages for the removal of growths and foreign bodies dates back over three-quarters of a century, twenty-two years before the introduction of laryngoscopy in 1855, though it was seldom performed before that date on account of the great difficulty of making a definite diagnosis.

The operation was first suggested and strongly recommended by Desault<sup>5</sup> (Paris) in 1812 for the removal of laryngeal growths, though it was never actually carried out by him. Its origin has been wrongly attributed by Richardson (Washington)<sup>6</sup> to Sanger (Berlin). To Brauers<sup>7</sup> (Louvain) belongs the credit of having first performed the operation of thyro-fissure in 1833 on a male aged forty for papillomatous growth of the larynx, which he cauterised. *No tracheotomy tube was used*, the thyroid cartilage only was divided, and the patient survived the operation for twenty years.

<sup>1</sup> "Trans. Med. Chir. Soc.," 1882, lxy, p. 177.

<sup>2</sup> Holmes's "System of Surgery," vol. i, 1883, p. 768.

<sup>3</sup> *Brit. Med. Journ.*, 1898, vol. ii, p. 1218; also "Proc. Roy. Soc. Med." (Laryngol. Sect.), 1915, ix, p. 48.

<sup>4</sup> "Proc. Roy. Soc. Med. (Laryngol. Sect.), 1914, viii, p. 35.

<sup>5</sup> "Œuvres Chirurgicales par Bichat," Paris, 1812, ii, p. 255. Quoted by Durham, "On the Operation of Opening the Larynx by Section of the Cartilage," etc., "Trans. Med. Chir. Soc.," 1872, lv, p. 17.

<sup>6</sup> Discussion on StClair Thomson's paper, "Intrinsic Cancer of the Larynx," "Trans. Amer. Laryngol. Assoc.," 1914, p. 40.

<sup>7</sup> *Journ. de Gräfe et Walther*, 1834, xxi, p. 534. Quoted by Ehrmann, "Histoire des Polypes du Larynx," 1834, p. 12. Quoted by Durham, *op. cit.*, pp. 30 and 69.

This case was remarkable in the correctness of the diagnosis without the aid of the laryngoscope, and the fact that the operation was performed without a preliminary tracheotomy, and without the aid of anæsthesia—a most brilliant achievement.

Ehrmann<sup>1</sup> (Strasbourg), ten years later, in 1844, removed a papillomatous growth by this route in a female aged thirty-three. He first performed a preliminary tracheotomy, followed forty-eight hours later by a complete laryngo-fissure, the tube being removed the following day. The patient was placed in an arm-chair with the head well extended and held—no anæsthetic being used—and is said to have submitted to the operation “with much calmness and courage.” The wound was brought together by adhesive plaster, and healed in twenty-one days. The patient unfortunately died six months later from typhoid fever. Erhmann must, therefore, share with Brauers the honour and credit of having initiated this operation.

Then followed Gurdon Buck<sup>2</sup> (New York) in 1851, who was the first to operate on a malignant growth by this method in a female aged fifty-one. Both the thyroid and cricoid cartilages were divided. The growth, which was an epithelioma, was extensive, and was not entirely removed, two subsequent operations being performed, and death occurred fifteen months later. A tracheotomy tube was inserted and retained to the last. The operation was performed without any anæsthetic. The patient, who was seated on a low chair before a window with the head extended, and the front legs of the chair raised 3 in. upon blocks, is said to have “displayed the most remarkable courage throughout this very difficult and protracted operation,” which was delayed forty-eight hours between the tracheotomy and laryngo-fissure until the patient had recovered from the fatigue and exhaustion of the first operation.

These cases occurred before the general use of the laryngoscope, the introduction of which caused the operation to grow rapidly in favour.

To Gurdon Buck belongs the honour of being the first surgeon in the United States to perform this operation, also the first to carry out this operation on a malignant growth of the larynx.

This surgeon again, in 1862<sup>3</sup>, performed a thyro-fissure for a papillomatous growth in a male aged twenty-five, preceded some time previously by a tracheotomy; also in 1870<sup>4</sup> a laryngo-fissure for papilloma in a patient aged thirty-eight. An urgent tracheotomy was performed without any anæsthetic. Tube removed in three months.

Rauchfuss<sup>5</sup> (Petrograd), in 1861, opened the larynx in a woman for the removal of an extensive sarcomatous growth, both the thyroid and cricoid cartilages being divided, also the upper part of the trachea—a tracheotomy tube being inserted. The growth was incompletely removed, and extended rapidly, the patient dying two years later of gangrene of the lung. The tube was retained to the last. In the history of this case there is no mention of any anæsthetic.

Rauchfuss was the first surgeon in Europe to remove a growth from

<sup>1</sup> “Laryngotomie dan un cas de Polype du Larynx,” Strasbourg, 1844. Horace Green, “The Surgical Treatment of Polypi of the Larynx,” 1852, p. 47. Durham, *op. cit.*, p. 67.

<sup>2</sup> “Trans. Amer. Med. Assoc.,” 1853, vi, p. 510. Mackenzie, “Growths in the Larynx,” pp. 89 and 92. Quoted by Sands from “St. Luke’s Hosp. Reports,” *New York Med. Journ.*, May, 1865. Durham, *op. cit.*, pp. 76 and 83.

<sup>3</sup> Cited by Duncan Gibb, *Brit. Med. Journ.*, 1865, ii, p. 328.

<sup>4</sup> “Trans. New York Acad. Med.,” 1870, iii, pt. 10. Durham, *op. cit.*, p. 61.

<sup>5</sup> *St. Petersburg Medizin. Zeitsch.*, 1862, iii, pp. 153; and vi, p. 43. Durham, *op. cit.*, p. 82.



the larynx which had been diagnosed with the laryngoscope (six years after its introduction) by means of laryngo-fissure.

H. B. Sands<sup>1</sup> (New York), in 1863, performed the operation on a female, aged thirty, for carcinoma of the larynx, which originated from the left ventricle, and this is the first case recorded in the United States where the diagnosis of malignancy was made with the laryngoscope (by sunlight) previous to this operation being performed. The thyroid isthmus was first divided and a median tracheotomy performed—the thyroid and cricoid cartilages being afterwards divided, and the tube removed on the fifth day. Patient died twenty-two months later of cancer of the kidney without any recurrence in the larynx. Ether was used as an anæsthetic with the patient lying down and the head well extended. No gauze or sponge packing was used in the trachea above the tracheotomy tube (which was an ordinary one), and the wound was closed by sutures.

It is interesting to note that this is the first case recorded where laryngo-fissure was performed under ether inhalation since the introduction of this anæsthetic by Morton in 1846.

Boeckel<sup>2</sup> (Strasbourg), in 1863, carried out a laryngo-fissure with preliminary tracheotomy for syphilitic stenosis, and Busch<sup>3</sup> (Bonn) also in the same way for a syphilitic growth, the cannula being continuously worn. In the first case the patient succumbed to inflammation of the lungs three months later. No anæsthetic was used in either case, and in the first case the patient is said to have "suffered greatly" from the operation.

In 1864 Ulrich and Lewin<sup>4</sup> (Berlin) and Gilewski<sup>5</sup> (Cracow) performed thyro-fissure for papilloma, and Debrou<sup>6</sup> (Orleans) for a fibrous growth. In the first case chloroform was used, and the wound was brought together by strips of plaster. This is the first record of thyro-fissure having been performed under chloroform anæsthesia since its introduction by Simpson in 1847. In the second case chloroform was also used, whilst in the third case no anæsthetic is mentioned. Debrou was the first to record a case where the thyroid cartilage only was divided, *i. e.* a thyro-fissure performed, since Brauer's original case in 1833. It is interesting to note that all five operators diagnosed their cases by the laryngoscope, and performed a preliminary tracheotomy or laryngotomy, with the exception of Gilewski, who used no tube: the first two performed a laryngo-fissure, whilst the three latter a thyro-fissure.

Duncan Gibb,<sup>7</sup> in 1864, was the first to bring to the notice of the profession in this country the subject of thyrotomy for the removal of morbid growths when he performed a laryngo-fissure and removed an epithelioma in a female, aged twenty-nine, the thyroid and cricoid being divided, preceded eight days previously by a tracheotomy. The case was diagnosed by the laryngoscope. Patient died one year later of recurrence, the tube being retained all the time. The operation was performed under

<sup>1</sup> *New York Med. Journ.*, 1865, i, p. 110. Durham, *op. cit.*, p. 40.

<sup>2</sup> "Mémoires de la Société de Chirurgie de Paris," 1863, iv, p. 537. Durham, *op. cit.*, p. 70.

<sup>3</sup> Extrait de la *Thèse de Swebel*, Strasbourg, 1866. "Beobachtungen zur innern Klinik," von Carl Binz, Bonn, 1864, p. 108. Durham, *op. cit.*, p. 75.

<sup>4</sup> *Wiener Med. Woch.*, 1865, p. 147. *Berlin Klin. Wochenschr.*, Dec., 1864, No. 52. *Brit. Med. Journ.*, 1865, i, p. 253. Durham, *op. cit.*, 42.

<sup>5</sup> *Wiener Med. Woch.*, June 28, 1865, p. 142. *Brit. Med. Journ.*, 1865, ii, p. 333. Durham, *op. cit.*, p. 46.

<sup>6</sup> *Gazette Hebdomadaire*, 1864, May 20, p. 347. Durham, *op. cit.*, p. 88.

<sup>7</sup> *Brit. Med. Journ.*, 1865, ii, p. 327. Durham, *op. cit.*, p. 78.

chloroform anæsthesia, no gauze or sponge packing was used above the tracheotomy tube, and the wound was brought together by two metallic sutures. Patient was sitting up on the fifth day, and eating heartily by the fourteenth. It is interesting to note Duncan Gibb's summary of the operation as follows: "Although perhaps the operation, at first sight, seems to be formidable, it ought to be one of the simplest performed upon the neck." He also expresses the opinion that tracheotomy much simplifies the proceeding.

Gouley<sup>1</sup> (New York), in 1865, opened the larynx of a child, aged six, under chloroform for papilloma by preliminary tracheotomy and laryngo-fissure, the operation being repeated nine months later for recurrence. The tube was removed three months after the second operation.

Koeberle<sup>2</sup> (Strasbourg), in 1865, performed a thyro-fissure in a patient, aged fifty-seven, for a condylomatous growth, the internal surface of the thyroid cartilage was exposed, and the right vocal cord removed. A laryngotomy tube was still worn seven months after.

Balassa (Pesth), between 1865 and 1868, performed three laryngo-fissures and one thyro-fissure in patients whose ages varied from 19 to 44. Three cases were papilloma<sup>3</sup> and one sarcoma.<sup>4</sup>

Tracheotomy was performed in each case. No reference was made to the anæsthetic used.

L. Voss<sup>5</sup> (New York), in 1866, had a similar case of tracheotomy and laryngo-fissure, in which he also re-operated six months later.

Arthur E. Durham,<sup>6</sup> in 1866, performed his first operation on a child, aged thirteen, for papilloma. Tracheotomy had been performed four years previously. He divided both thyroid and cricoid cartilages in order, as he says, "to obtain sufficient room." The tube was removed on the tenth day after the laryngo-fissure operation.

Ephraim Cutler<sup>7</sup> (Boston), in 1867, carried out a thyro-fissure for a sessile growth in a patient, aged fifty-six, which recurred sixteen months later. He is said to have been the first surgeon to perform this operation without recourse to tracheotomy. This, however, is not correct, for Ehrmann has definitely placed on record the case of Brauer's in 1833, also there is the case of Gilewski in 1864.

Timothy Holmes,<sup>8</sup> in 1867, performed this operation on a child, aged nine, for papilloma by a preliminary tracheotomy and laryngo-fissure. The canula had to be persistently worn. Also in the same year Long<sup>9</sup> (Liverpool) refers to a similar case.

Morell Mackenzie,<sup>10</sup> in carrying out his first operation of thyro-fissure in 1868 on a lady, aged sixty-six, for papilloma, used only local anæsthesia, a preliminary tracheotomy being performed. This is the first recorded case where a local anæsthetic was used; and the author is

<sup>1</sup> *New York Med. Journ.*, 1867, v, p. 473. Durham, *op. cit.*, p. 44.

<sup>2</sup> *Thèse de Suebel*, Strasbourg, 1868. Durham, *op. cit.*, p. 73.

<sup>3</sup> *Wiener Med. Woch.*, November 11, 14 and 18, 1868. Durham, *op. cit.*, pp. 47, 49, 51.

<sup>4</sup> *Wiener Med. Woch.*, November 14, 1868. Durham, *op. cit.*, p. 53.

<sup>5</sup> Voss, by private letter to Arthur E. Durham, "Trans. Med. Chir. Soc.," 1872, iv, p. 87.

<sup>6</sup> "Trans. Med. Chir. Soc." 1872, iv, p. 18. "Guy's Hosp. Reports," 1866, xii, p. 540.

<sup>7</sup> *Boston Med. and Surg. Journ.*, 1869, iii, p. 37. Durham, *op. cit.*, p. 63.

<sup>8</sup> "Surgical Treatment of Children's Diseases" (2nd edition), London, 1869, p. 311. Durham, *op. cit.*, p. 84.

<sup>9</sup> "Liverpool Hosp. Reports," 1867, p. 9. Durham, *op. cit.*, p. 28.

<sup>10</sup> "Growths in the Larynx," 1871, pp. 166 and 183. Durham, *op. cit.*, pp. 54 and 80.

indebted to Mark Hovell for the information that anhydrous sulphuric ether was used by means of a spray (Richardson's) projected on to the neck so as to cause local freezing. Morell Mackenzie also refers to another case in 1869 of epithelioma in which tracheotomy was performed two weeks before the thyro-fissure, the growth was only partially removed, with recurrence, and death seven months later.

Two other cases of thyro-fissure were reported by Pugin Thornton<sup>1</sup> from the Golden Square Hospital in 1872. A patient, aged twenty-four, suffering from epithelioma, preliminary tracheotomy was performed, but the patient only survived ten months. Also another in a patient, aged two and a half years, suffering from papilloma, preliminary tracheotomy being performed.

Navratil<sup>2</sup> (Pesth), in 1868, had three cases of papilloma, ages varying from 20 to 30. In one he performed laryngo-fissure and in two thyro-fissure. In one case no tracheotomy was performed, and one thyro-fissure was performed under local anæsthesia of ether.

Solis Cohen<sup>3</sup> (New York), in 1868, having seen Cutter operate, himself performed a thyro-fissure for a fibroid growth preceded by tracheotomy.

Then followed Krishaber<sup>4</sup> (Paris) in 1869 with a thyro-fissure *without tracheotomy* for a papilloma originating from the right ventricle of Morgagni in a patient aged thirty-eight. The operation was performed with the patient lying in bed, without an anæsthetic, and to assure himself of the integrity of the vocal cords before the thyroid cartilage was closed, the operator told the patient to sing over the scale—showing everything normal.

Schrotter<sup>5</sup> (Vienna) performed the same year preliminary tracheotomy and laryngo-fissure for extensive carcinomatous disease—"great difficulty being experienced in dividing and separating the thyroid and cricoid cartilages on account of their ossified condition." Death occurred eleven days later from blood poisoning.

Denuce<sup>6</sup> (Bordeaux), in 1870, performed this operation in a patient, aged fifty-four; also Ogle and Lee<sup>7</sup> at St. George's Hospital in 1871 for papilloma in a child, aged five; and Langenbeck<sup>8</sup> (Berlin), in 1871, a laryngo-fissure and tracheotomy for a subglottic epithelioma in a male, aged twenty-eight.

Arthur E. Durham<sup>9</sup> and his colleagues Bryant and Davies-Colley at Guy's Hospital, between 1862 and 1872, performed 5 of these operations for papilloma in children whose ages varied from three to nine years of age.

In 1870, Durham collected together 138 cases of new growths of the larynx, and compared those removed through the mouth and natural passages, numbering 114, with 24 removed by external fissure of the

<sup>1</sup> *Brit. Med. Journ.*, 1873, i, p. 460. "Trans. Clin. Soc. Lond.," 1872, pp. 90 and 92.

<sup>2</sup> *Berlin Klin. W'och.*, December 7, 1886, pp. 501, 502. Durham, *op. cit.*, p. 57 and 85.

<sup>3</sup> *New York Med. Record*, August, 1869. Cohen, "Diseases of Throat," 1872, p. 445. Virchow's "Jahresbericht" (Berlin), 1870, Bd. iii, p. 117. Durham, *op. cit.*, p. 55.

<sup>4</sup> *Med. Times and Gazette*, 1869, November 20, p. 596. *Gazette des Hôpitaux*, No. 103, 1869. Durham, *op. cit.*, p. 58.

<sup>5</sup> *Medizinische Jahrbucher*, Wien, 1869, xvii, Heft 2, p. 81. Virchow's "Jahresbericht," Berlin, 1870, vol. ii. Durham, *op. cit.*, p. 88.

<sup>6</sup> Denuce, *Bordeaux Médicale*, February 15, 1872. Quoted by Morell Mackenzie, *Brit. Med. Journ.*, 1873, i, p. 459.

<sup>7</sup> Durham, *op. cit.*, p. 28.

<sup>8</sup> *Brit. Med. Journ.*, 1871, ii, p. 529. Durham, *op. cit.*, p. 61.

<sup>9</sup> "System of Surgery," 2nd edition, 1870, iv, p. 584.

larynx. Amongst the former, 94 were completely successful, 17 partially successful, and 3 deaths; whilst amongst the latter, 15 were completely successful, 5 partially successful, and 4 deaths. Out of the total, 5 cases were cancerous, whilst out of the 7 fatal cases 5 were malignant.

In 1872, he published<sup>1</sup> in considerable detail all the cases he could find recorded up to that date in which the thyroid cartilages had been severed for the removal of morbid growths and found that there were 32 in number, excluding the 5 performed by himself or colleagues at Guy's Hospital between 1862 and 1872. Reference to these cases has been freely made in compiling the history of this operation. Out of a total of 37 cases, so far as the operation of thyrotomy was concerned, it was successful or partially so in 31, temporary benefit only in 4 which were cancerous, and only 2 deaths more or less directly due to the operation itself. It will be observed that during this period there was no discrimination whatever in the choice of cases—the majority being performed for papillomatous growth.

*(To be continued.)*

## A NEW SYMPTOM OF LABYRINTH FISTULA.

By S. H. MYGIND, M.D.,

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In December, 1916, an elderly woman was brought into the ear and throat department of the Municipality Hospital suffering from a supuration of the left middle ear. The disease had lasted for about two months, lately a sudden and severe giddiness had appeared. The patient had for some years complained of congestions to the head, and now these were often followed by giddiness.

On our cleansing out the left ear she became giddy and showed a nystagmus to the left, but it was not possible to produce a real fistula symptom in the ordinary way. There was a slight nystagmus when looking to the right as well as when looking to the left; when looking straight forward the eyes were not kept perfectly quiet. I therefore let her look straight out through the biconvex spectacles of Bartels, and now the bulbi could be seen moving from one side to another with a peculiar "soft" regular rhythm. The movements were of an equal, horizontal-rotatory type and very small. I put my finger on the patient's pulse and discovered that it was beating in time with the movements of the eyes, each stroke of the pulse being accompanied by one movement to the left and one to the right.

This phenomenon I had not seen before. The reason for it, I thought, might be a pulsation in a hyperæmic tissue in a diseased labyrinth, the walls of which could yield to the endolymph, so that it might flow to and fro through the ampulla. Constantly changing movements of the eyes might thus be produced, and each single movement was to be considered as a slow vestibular phase of nystagmus.

Now it struck me that if I were right in my theory, a change of the circulation of blood in the labyrinth would produce an alteration of the

<sup>1</sup> "On the Operation of Opening the Larynx by Section of the Cartilages for the Removal of Morbid Growths," "Trans. Med. Chir. Soc.," 1872, lv, p. 17.



movements of the eyeballs. I therefore put my finger on the left side of the neck and pressed it against the carotid in order to block the flow of the blood to the left labyrinth. Immediately the patient's eyes made a pronounced nystagmus of horizontal-rotatory character to the right healthy side; somewhat later—the finger still compressing the carotid—it stopped and turned to the left. During the nystagmus the patient felt giddy, especially during the nystagmus to the left, which also seemed to be the stronger. Repeated experiments constantly gave the same results.

The operation confirmed my theory: the resection of the middle ear exhibited a fistula in the external semicircular canal, filled up by granulations. After the operation the patient went on all right, but three months later she suddenly developed labyrinthitis accompanied by meningitis, from which she died, although a resection of the labyrinth immediately was performed. The fistula looked exactly as at the first operation.

The case seemed rare and interesting, worthy of publishing, but I did not follow it up. I saw other cases of labyrinth fistula, but had nearly forgotten my observations, when I got a new case last November, that is about a year after the first one.

It was a man, who had chronic middle-ear suppuration on both sides. The right ear had been operated upon three months previously. As the hearing on this ear was so very poor as well before as after the operation, we had not liked to operate on the other ear, in which the hearing was comparatively good. But suddenly the patient was attacked with a severe giddiness with a nystagmus to the left side. In the left ear a large polypus was seen. We tried the fistula symptom in the ordinary ways several times, but without any result. I then remembered my first case, and put my finger on the left carotid of the patient. Immediately both eyes moved slowly towards the left, and then made a strong rotatory nystagmus towards the other side accompanied by giddiness. As I continued my pressure, the nystagmus stopped, but as soon as I let my finger go the eyes moved slowly to the right and then as a quick rotatory nystagmus to the left. A difference between nystagmus to the left and to the right was not to be found. All these phenomena could constantly be produced during several days. The caloric reaction was intact; the post-rotatory reaction perhaps showed a somewhat increased irritability of the left ear.

From this new symptom alone the diagnosis was made; a fistula in the left external semicircular canal filled up with granulations. The operation confirmed this. In the antrum and the middle ear a large massive cholesteatoma was found, sufficiently explaining why the ordinary fistula symptom could not be produced.

Since the operation a pressure on the carotid has not had any effect upon the eyes.

A few days afterwards another patient happened to come under treatment in our department suffering from a chronic suppuration in the right middle ear. Some days before he had had his first attack of giddiness.

It was impossible to produce any fistula symptom at all in this case, neither by compressing or aspirating as usual in the external meatus nor by pressing on the tragus. There was no spontaneous nystagmus. On compressing the carotid nothing abnormal was seen, but the eyes were difficult to observe, as the patient could not keep them steady,

and he became giddy, which circumstance raised suspicions that there might be a hidden reaction. Next day this was really obtained; a pressure on the carotid made both eyes move slowly to the right, followed by a few quick excursions to the left. A continued pressure had no effect, but as soon as the finger was removed there appeared a slow movement to the left and a nystagmus to the right. Giddiness accompanied the movement of the eyes. While the phenomena in the two first patients were well marked and very easy to observe, they were very slight in the last case and only to be seen by a trained eye. In all the cases the symptom was only obtainable by pressure on the carotid on the diseased side, a pressure on the other carotid or on the skin alone had no effect whatever.

In this case also a fistula in the external semicircular canal was diagnosed. The diagnosis was corroborated some days later by the producing of a nystagmus to the right side by compressing the tragus. The operation revealed a small fistula in the back part of the canal, filled with granulations. Since the operation my fistula symptom has disappeared.

The fourth patient was an officer, aged fifty-six, who for many years has had a suppurative of the left middle ear. He had been perfectly deaf for a long time. Three months previous to coming under treatment he accidentally discovered that a pressure on the left tragus made him very giddy, but this phenomenon disappeared later on. There had been no real attack of giddiness. There was a slight headache and some pains in the left ear. The examination showed a fistula towards the antrum with some granulations and very little secretion. The left ear was perfectly deaf. The caloric reaction was intact; the postrotatory nystagmus only lasted a few seconds, especially to the diseased side.

An "inverse" fistula symptom was found, as compression in the external meatus produced a nystagmus to the sound side, and aspiration a somewhat stronger nystagmus to the diseased side; the slow phase was only slightly pronounced. The accompanying giddiness was only slight. There was some spontaneous nystagmus, now pointing to the one, now to the other side, and sometimes wanting. When the patient's eyes were observed looking straight forward through the spectacles of Bartels, they were seen to move steadily from one side to another synchronous with the beat of the pulse, just as in the first case.

By compressing the carotid a very fine fistula symptom was seen: after a somewhat faint, slow movement to the diseased side, the eyes turned with a strong, principally rotary nystagmus to the sound side. This nystagmus lasted rather long, about 15-20 seconds; first, when the pressure on the carotid stopped, the opposite movements were seen. Repeated examinations constantly gave the same results as to the effect of the pressure, but the eyes did not move each time when pressure ceased, but when they did so the movements were very marked, more even so than under pressure. As I demonstrated the case to the patient's medical man, and explained to him how the movements of the eyes synchronous with the pulse were produced, the patient said: "You are right; I always feel the pulse beating in my left ear, and it is as if what I am looking at is at each stroke pushed to the one side; for instance, when I am reading a book."

While thus the ordinary fistula symptom was inverse, and theoretically might mean a fistula to the vestibulum (a rule that is often

known to fail), my symptom was "regular," and indicated a fistula in the external semicircular canal. This was also found on operating. The fistula was large and oblong, it was dark, and was not, as in the other three cases, filled up with granulations, though such, of course, would have been found deeper down. In the antrum a cholesteatoma was found; above and in front of the facial spur some caries were seen, which accounted for a slight paresis of the facial nerve from which the patient had been suffering from for many years. The possibility, therefore, of another fistula existing leading to the vestibulum cannot be absolutely denied.

After the operation the spontaneous movements of the eyes disappeared. In the first days immediately after the operation a slight nystagmus to the sound side could be produced by compressing the carotid.

This new fistula symptom I have thus found in four cases, which are also the only cases of non-operated labyrinth fistula where I have tried my method. This symptom does not seem to have been described before.

By compressing and aspirating in the ordinary way a "fistula symptom without any fistula" can sometimes be found in patients suffering from syphilis, as first reported by Hennebert. In some of these cases Bárány (1) has also been able to produce a nystagmus by a pressure on the side of the neck; he believes that this is due to a compressing of the carotid. But, first of all, in these rare cases we are not dealing with a real fistula; and, secondly, Bárány has not shown the particular changing of the movements of the eyes by removing the pressure, which alone could prove that the eye movements, produced by compressing the side of the neck, are due to a mechanism corresponding to that of the movements produced by compressing-aspirating in the external meatus. I myself, however, am inclined to believe that such a correspondence really exists. By patients suffering from syphilis we perhaps have to deal with an abnormal vascularisation in a labyrinth, the stapes of which is capable to give way in an abnormal degree.

In the discussion on the Bárány report referred to above, V. Urbantschitsch related that he had several times seen a nystagmus produced by compressing the side of the neck. He does not say anything about labyrinth fistula, and explains it as a "reflectory" nystagmus. In his text-book of otology, to which he refers, I have not been able to find anything that bears any relation to my observations.

Neither is anything to be found in the detailed works of the last years, such as those of Hofer (2) and Ruttin (3), both published from Urbantschitsch Clinic in Vienna.

Ruttin, in the discussion referred to above, reported a case of nystagmus produced by pressure on a large emissarium mastoideum; and O. Beck communicated a case of chronic catarrh of the middle ear, where a nystagmus was produced by vibrating massage of the sternocleidomastoid muscle. In none of these cases was a changing of the nystagmus by cessation of pressure mentioned.

V. Urbantschitsch has since published a peculiar case of cholesteatoma of the middle ear with fistula of the labyrinth, and also fistula symptom produced by compressing-aspirating in the ordinary way: a nystagmus could also be produced by pressure on a certain spot on the back of the head, but only when the patient bent her head to the diseased side. When the spot was made anaesthetic, a pressure on it no longer had any effect. In such a case we have perhaps to do with a nystagmus of a combined reflectory and "vascular" origin.



Rocking, rotatory, uniform movements of the eyes by looking straight forward have been described before in cases of labyrinth fistula by Bárány, Hofer, and Ruttin. Ruttin has explained the phenomenon correctly as consisting of two slow phases of oppositely directed nystagmus, but their origin neither he nor Hofer, who has seen five such cases, have been able to make out, as they have not discovered that the movements are synchronous with the pulse.

I should think that a systematic investigation of this new fistula symptom might perhaps throw some light on the syphilitic diseases of the labyrinth and on some forms of "reflexory" nystagmus; but my principal hope is that it may be of some help in elucidating several questions as to labyrinth fistulas themselves.

I am inclined to believe that the directions of the nystagmus produced by my method, in opposition to the ordinary fistula symptom, gives a more reliable basis for the differential diagnosis—fistula leading to the vestibulum or to the (external) semicircular canal. In the first case we have to expect—by compressing the carotid—a slow phase to the diseased side, followed by a quick phase to the sound side, and by removing pressure just the opposite movements; while we, in the second case, should meet with a slow phase to the sound side and a quick to the diseased side during the pressure, and with the opposite movements when removing it. Thus it will be seen that the carotid pressure generally acts like the aspirating in the ear duct, the cessation of it as the compressing.

When we, by the ordinary method, obtain an "irregular" fistula symptom—that means to say, another direction of the nystagmus than we, in accordance with the localisation of the fistula, should have expected—this has been explained by Herzog (5) in the following way: To produce a flow of the endolymph, strong enough to irritate the nervous epithelium of the ampulla, a moving inward of the fistula by pressure on it is not sufficient. To make the endolymph flow through the ampulla it is necessary that the membrane of the fenestra rotunda moves outwards, and in this way increases the capacity of the vestibulum. But in some cases where the fistula itself is isolated by granulations and cholesteatoma from the effect of compressing or aspiration, this may act instead on the fenestra; this being pushed inwards now makes the endolymph stream the opposite way to formerly, *i.e.* backwards, the seat of the fistula moving outwards. The result is a nystagmus in the opposite direction to formerly, but the site of the fistula is in both cases the same.

I think this is a very plausible theory, but there are certain forms of fistula symptoms which, in my opinion, cannot be explained by it. In cases where a nystagmus to the same side is produced as well by the compression as by the aspiration, I prefer my "vascular" theory.

When sudden movements of the head sometimes are followed by an attack of giddiness and nystagmus in patients suffering from labyrinth fistula, this may be due to a changing of the blood circulation in the fistula, produced by the action of the muscles of the neck (especially in bending backwards). A direct effect on the endolymph by the movement of the head seems less probable, as the experimental postrotatory giddiness generally is wanting or very slight by these patients.

I believe that my fistula symptom also indicates an active inflammation of the fistula. The symptom seems to disappear after the operation, perhaps because there now is room in the middle ear, so that the granulations yield in this direction for the pressure of the blood.



Whether the symptom may occur without there being any fistula we cannot yet tell. Perhaps a very feeble symptom may be seen by a circumscribed labyrinthitis without any fistula. But I should not think that it is to be found in a sound labyrinth, as is the ordinary symptom. Then we must remember that the pressure used by my method, *i. e.* the pressure of the blood, is much less than the pressure produced by the balloon of the old method. I, therefore, also believe that there is not so much risk attached to the new method. Besides, it is very simple, and if the investigator is not experienced in observing the sometimes rather slight nystagmus, it is sufficient to notice whether the patient gets giddy or not. By a pressure on the other side he will be able to control, whether the giddiness is due to an irritation of the labyrinth or to an anæmia of the brain. I think we here have a method of value to every practitioner, for it is doubtless a frequent symptom, indeed, is probably present in as good as all cases of non-operated labyrinth fistula.

How much of these expectations as to this symptom the future will realise it is impossible to say, but it is certain that the phenomenon has in the four above-mentioned cases given valuable indications where other symptoms of labyrinth fistula have been uncertain or entirely absent. It is, therefore, desirable that this symptom should in future become a regular part of the general otological examination to the same extent as the hitherto practised fistula method.

I have to express my thanks to the director of the Ear and Throat Department of the Commune Hospital of Copenhagen, Prof. Holger Mygind, who performed all the operations mentioned in this paper, for allowing me to publish these cases.

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## SOCIETIES' PROCEEDINGS.

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### ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

March 2, 1917.

President: Mr. T. MARK HOVELL.

**Laryngeal Stridor due to Chronic Osteo-arthritis, relieved by Dilatation.**—J. Dundas Grant.—The patient, a woman, aged over sixty, had suffered with discomfort in her throat for over fourteen years, and in the early part of 1912 developed a hard cough and noises in respiration observed mainly during sleep. The stridor was extremely

marked, and there was complete absence of abduction, the vocal processes remaining in complete contact, there being only a narrow elliptical slit between the cords through which respiration was carried on. At first sight the case seemed to be one of bilateral paralysis of the abductors. Fourteen years previously she states she had an ulcer in her throat, close to the vocal cords, which was cauterised twice a week for six weeks with a brush. The possibility of cicatricial contraction as the result of cauterisation was, therefore, considered. She, however, presented distinct signs of chronic osteo-arthritis, and it seemed that this condition was present in the crico-arytænoid joints. A weak spray of cocaine seemed to diminish the severity of the attacks of stridor, but she obtained no marked relief until dilatation by means of Schrötter's tubes was carried out. It cannot be said that even now there is any material movement of the arytenoids, but the elliptical breathing space is certainly larger and the improvement in the respiration is extremely marked.

MR. TILLEY: I was interested in this case because, on April 1, last year, a colonel, aged seventy-seven, bowed down with chronic rheumatism in all his limbs, came to me. The story was that in 1881 he had noticed he had difficulty in breathing. In 1884 he was obliged to retire from the Service on account of constant attacks of breathlessness, and one night he was nearly suffocated by extra severe dyspnoea. In April of last year his stridor was extreme, and there was bilateral adduction of both cords, and I thought his condition serious. Radiography did not reveal anything in the chest in the way of new growth or aneurysm: indeed one would hardly expect either of these after such a long history. What was the nature of this adduction of the cords? In view of the general condition of his joints it was imagined he might have fixation of both crico-arytænoid joints. On December 28 last, I was asked to see him at his home. He was practically moribund and died three hours after I left. The "notch" of the thyroid was level with the manubrium sterni, *râles* in the lung were pronounced and extensive, and he was cyanosed. The laryngeal aspect of the case seems very similar to the one Dr. Grant is now showing. In the absence of a *post-mortem* examination, it was impossible to say whether there was any lesion pressing on either recurrent laryngeal nerve. If we exclude new growth and aneurysm in such a case, we are left with the possibility of a condition such as is illustrated by the present case.

SIR STCLAIR THOMSON: In this, as in similar cases, the last diagnosis we should give is fixation of the arytenoid joint, because I believe it is one of the rarest occurrences in laryngology, and absolutely proved cases of it are few and far between. This case seems to me more like cicatricial stenosis, with the interarytænoid space gone; for the cords are almost joined to one another. It is like a condition I have seen in a number of cases of tuberculosis, in which spontaneous healing takes place at the interarytænoid region, and the scar tissue draws the posterior ends of the cords so close together that in some cases I have had to do tracheotomy. On watching the present patient's arytenoids carefully when she is asked to phonate, the arytenoid is seen to swing on its base, particularly on one side. So I ask whether all other conditions have been excluded. I do not suppose this is tubercular, but it may be an old syphilitic case, and perhaps the Wassermann test may help us. Passing from that aspect, I would ask: "Why spare tracheotomy in such a case?" It seems a pity considering that tracheotomy is such a

simple and safe procedure, and can be done without a general anæsthetic. This patient has had her discomfort fourteen years, and I do not see why she should not enjoy life, and I see no objection to her having a tracheotomy tube, especially as she may be able to discard it at a future date. Meantime it would also afford rest to the larynx. If the trouble is mechanical, she could wear an O'Dwyer's tube, which will produce successful dilatation.

Dr. W. HILL: A prolonged case of abductor paralysis is liable to end in immobilisation, partial or complete, of the crico-arytænoid joint. Why that takes place I am not prepared to say, but I assured myself it was present in one case. In that case, one vocal cord was completely paralysed, as the result of an operation for goitre many years before. The arytenoid was fixed in a bad position: the cornicula pointed towards the middle line, whereas in Dr. Grant's case the vocal processes are in approximation. In my case, I was able, with my finger, to feel the arytenoid on the paralysed side, and it was as immobile as if it were ankylosed to the cricoid cartilage. I thought I should be able easily to take away that cartilage with forceps by the direct method, but it was so fixed that it would have needed to be cut out, and I did not do it. At a later date I did laryngofissure, for something else, and I then felt the joint again, and pointed out to those present that the joint was immobile. The deformity present there was the opposite to that in Dr. Grant's case. Conceivably this is a post-paralytic contracture of the muscles of the joint, which has become so fixed that the arytenoids do not move. [Drawing and demonstration.] I recommend Dr. Grant to try the following method: Put down a direct vision tube, and then put down the metal end of a pencil protector—of course, without the rubber—on to the cornicula, and then see if the arytenoid will oscillate. In my case, the arytenoid on the immobile side would not move, but the other side was freely movable.

Dr. F. DE HAVILLAND HALL: After the discussion we have had on this case, I hope that if Dr. Grant intends to continue the use of Schrötter's tubes, he will have the great patience which such treatment will demand. I remember that in my early and enthusiastic days I had experience of dilatation of the larynx, and I found it most disappointing. If, in the case of the out-patient department of the hospital, the patient failed to come at the due date, the condition, when next he came, was found to have relapsed in a most discouraging manner. I have come to regard the means as almost hopeless, especially in the case of out-patients.

Mr. CYRIL HORSFORD: Two or three days ago I saw a case of typical double abductor paralysis, for which I could find no cause: there were no signs of growth in the mediastinum or the neck, nor anything to throw light on the cause of the condition. The stridor, though obvious, was not alarming. I advised her doctor that, before it got too late, tracheotomy should be done, at the same time pointing out that she would be able to use her voice well. I stated what I believe is Semon's law, that eventually, when the paralysis becomes complete, the cords recede until they occupy the cadaveric position. I ask whether that is so. If so, it does not appear to confirm Dr. Hill's theory that the cords become fixed in an awkward position. If the later stage is adductor, not abductor, paralysis, one would expect to be able to promise, after some time, that the tube could be removed. That is a strong recommendation for the early insertion of a tube. I shall try

to induce my patient to come and show herself next time. It has been going on for four years.

Dr. DONELAN: About ten years ago I showed the case of a lady who had caught cold and got fixation of the left arytenoid. The case was diagnosed by Sir Henry Butlin and Sir Felix Semon and others as rheumatic fixation of the arytenoid cartilage. I mention it because of what Mr. Cyril Horsford has just said as to the position of the cord. The cord lay in the cadaveric position, and had done so from the first. I was glad to have my impression that it might be a syphilitic condition in this case anticipated by Sir StClair Thomson. It looks very much like a case of old syphilitic stenosis I saw recently in which there was fixation by similar bands of adhesion.

Dr. DAN MCKENZIE: I do not know whether Dr. Grant has examined the case by hypo-pharyngoscopy. I have seen the method described as rough, but I do not find it upsets the patient at all, and it is easily applied. Arguing on the grounds of probability, one would say that osteo-arthritis of the crico-arytenoid articulation would be unlikely to result in such a position of both arytenoid cartilages as to bring both cords simultaneously into the position of adduction. I think it would be useful to have the larynx skiagraphed. I remember one case in particular in which the cord lay in abduction, and it was a simple matter to examine the patient by hypo-pharyngoscopy, and one then saw a great swelling behind the arytenoid of the affected cord. It persisted many years, and I concluded there was a chronic change in the bone.

Dr. DUNDAS GRANT (in reply): I thank members for their remarks. I think, with Mr. Tilley, that the two conditions are associated: it could scarcely be a mere coincidence, though there is much in what Sir StClair Thomson says as to the possibility. The appearance is such as would be produced by such a cicatricial contraction as he and I have seen in tuberculosis: I saw it also in one case in which applications of trichloracetic acid had been too zealously made for the destruction of tuberculous nodules in the interarytenoid space. That patient had very distressing stridor, which, however, settled down later. I think the possibility of bilateral paralysis of abductors may be left out of account. The reason which Dr. Hill adduced is incontrovertible. The patient has been very greatly benefited by the introduction of these tubes, even at longer intervals, and she has never gone back to the condition she was in before. I have not practised hypo-pharyngoscopy in this case, but I looked carefully for distortion of the joints. I think Sir StClair Thomson found there was none. I admit it is a weak spot in the diagnosis of arthritis, because in a paper which Sir Felix Semon published a number of years ago, he said swelling of the joint was one of the characteristic features. X rays have not been used in the case, but I think they might be with advantage. I think the suggestion as to tracheotomy is a most appealing one, and probably that will be the ultimate solution.

**Symmetrical Fibromata on the Vocal Cords, removed simultaneously by means of the exhibitor's Forceps.—J. Dundas Grant.**  
—The patient, a fish-hawker, aged thirty-six, suffering from extreme hoarseness of eleven months' duration, came to Brompton Hospital and was referred to the throat department. There were elongated sessile fibromata covering the middle of the edges of both vocal cords.



The case seemed to invite the use of the exhibitor's so-called "safety" intra-laryngeal forceps, and at one introduction the fibromata were cut off with absolute completeness on the left side and almost absolute on the right; the voice was at once completely restored; the small recurring tags on the right side were destroyed by means of the galvano-cautery.

Dr. DUNDAS GRANT: There has been a recurrence since then, as the man has been using his voice, so that the case is not yet a cured one.

Dr. DAN MCKENZIE: I cannot refrain from once again speaking of the great usefulness of Dr. Grant's laryngeal forceps. Some time ago I tried to remove a little growth from the cord by the indirect method, and I used his forceps. I was delighted at the ease with which the fibroma was produced.

Dr. WILLIAM HILL: I have used Grant's forceps for the direct method. I have had them made straight for the purpose. I think they are about the best forceps one can use for small growths projecting from the cords.

Mr. CYRIL HORSFORD: I have not used Grant's forceps for growths on the vocal cord. I think this is a good opportunity to bring up one point for discussion—namely, as to the advisability of using the galvano-cautery for the destruction of simple growths on the edge of the vocal cords. It is done by many laryngologists, but I regard it as a most dangerous operation, and from the artistic point of view, especially in the case of singers, the result is fatal as regards the voice. I think it would be valuable to hear a few experiences and views as to the suitability or advisability of the method.

**Lupoid Tuberculosis of the Pharynx in a Boy, aged eight, affecting the Soft Palate and Uvula.<sup>1</sup>—Irwin Moore.**—Patient, who was first seen on January 16, complained of a swelling in the neck under the chin, which was first noticed eight months ago. On examination, a semi-translucent swelling affecting the uvula was seen extending over the greater part of the soft palate, which, on palpation, felt solid, rigid, and leathery. The tonsils were not enlarged. Some adenoids which were present have since been removed, and were found to be tuberculous. The submental glands were enlarged and matted together, also enlarged discrete glands were present on both sides of the neck and in the inguinal region. There were no signs of pulmonary disease. With the exception of ulceration of the mouth when he was a year old, patient has been healthy, and has always had a good appetite.

Patient has been treated for six weeks with potass. iodide, and the submental glands have considerably decreased in size, but the condition of the pharynx is unchanged.

BLOOD REPORT (DR. EASTES' LABORATORY) ON FEBRUARY 16.

Number of red corpuscles . . .	4,390,000 per cubic millimetre.
Number of white corpuscles . . .	19,500 " "
Amount of hæmoglobin . . .	70 per cent. of the normal.
Colour index . . .	0.83.

<sup>1</sup> The original title given to this case was "Lymphadenoma (Hodgkin's disease)," but in view of the opinions expressed, and a later examination of the lungs showing slight active tuberculosis, it has been changed to "Lupoid Tuberculosis."

*Differential Count of 400 White Corpuscles.*

Small lymphocytes . . . . .	27 per cent.	} 40 per cent.
Large lymphocytes . . . . .	13 „	
Polymorphonuclears . . . . .	57 „	
Eosinophiles . . . . .	3 „	
Mast cells . . . . .	0 „	
		100

No poikilocytosis was observed. There is occasional "stippling" of the red discs.

Histological report on adenoid tissue removed from nasopharynx: "The lesion is undoubtedly tuberculous."

Dr. JOBSON HORNE, commenting on the description of the case printed on the agenda paper as "Lymphadenoma (Hodgkin's disease)," said: Before labelling the case as one of Hodgkin's disease we should remember that the term covers a large number of conditions, and that the growth removed from the nasopharynx is, in the opinion of the histologist, tuberculous. I could, had I known, have brought some specimens to compare with the one exhibited. Many years ago I did research work on the subject,<sup>1</sup> and from the same body I was able to demonstrate in the glands typical Hodgkin's disease, lymphosarcoma, and tuberculosis. I think we need to be a little more precise in this case.

Dr. DAN MCKENZIE: There is the fact that the submental glands are enlarged and matted together, which is not in favour of lymphadenoma, in which the glands remain discrete, there being no peri-adenitis to mat them together. Dr. Horne's opinion that the lesion is tuberculous is interesting, because I have heard him say that when multi-nucleated giant cells are found, one should be careful before calling it tuberculous. Lymphadenoma begins invariably in the cervical glands. I think it commonly affects the tonsil as well as the tonsillar gland, and this gives us the idea that whatever does produce lymphadenoma obtains entrance by the tonsil. Removal of the tonsils in lymphadenoma, even in an early case, however, has no effect on the course of the disease.

Dr. JOBSON HORNE: At a future meeting I shall be pleased to demonstrate specimens which illustrate the points I have raised. Another point is the part played by the larynx in Hodgkin's disease. In some cases I found ulceration in the larynx, and that, and not the tonsil, was the site of the infection.

Mr. FRANK ROSE: I agree with Dr. Jobson Horne's remarks as to the difficulty in establishing the diagnosis of Hodgkin's disease, or lymphadenoma. My experience is that in the *post-mortem* room a considerable proportion of the cases turn out to be something else, mostly tubercle. Before accepting that diagnosis in this case I think we require more convincing evidence.

<sup>1</sup> "The Larynx—a Site of Infection in certain Diseases of the Lymphatic Glands known as Lymphadenoma, Lymphosarcoma, Tuberculous Adenitis, with a Note on Primary Tuberculosis of the Organ," JOURNAL OF LARYNGOL., RHINOL., AND OTOL., December, 1901.

(To be continued.)

## Abstracts.

### PHARYNX.

**Clinical Problems Relating to the Faucial Tonsils in Adults.**—G. E. Shambaugh. "Annals of Otology," xxvi, p. 135.

The removal of tonsils in adults is by no means a minor operation, and, while the indications for it have been greatly increased by a better appreciation of the menace existing in tonsils as a seat of chronic infection, still it is quite evident that the indiscriminate removal of tonsils in adults is to be discouraged. The decision to remove the tonsil can be reached in a great many cases only after a useful investigation, which, to be complete, requires the co-operation of the internist.

*Macleod Yearsley.*

**The Tonsil Question in Children.**—G. W. Boot. "Annals of Otology," xxv, p. 129.

The author's advice is thus given: (1) Operate only for definite disease. (2) Be sure the tonsil condition is the cause of the disease. (3) Always do a urinalysis before operating. (4) Always inquire for a possible history of bleeding. (5) If not certain, test the blood coagulability. (6) Don't push the anæsthetic to the abolition of the laryngeal reflex. (7) Don't be slow in operating. (8) Don't destroy a functioning organ unless the gain more than offsets the loss. (9) The younger the patient the more carefully must the need of tonsillectomy be established.

*Macleod Yearsley.*

**Concerning the Indications for and Dangers of Tonsillectomy.**—G. B. Wood (Philadelphia). "Amer. Journ. Med. Sci.," August, 1917.

The operation of tonsillectomy is not free from danger, and while the percentage of fatal results is exceedingly small, serious complications are not very infrequent, so that although the benefit that accrues from the removal of an infecting tonsil often outweighs the risk of the operation, it is essential to have a clear understanding of the indications for the operation. The cases may be divided into two groups, namely: (1) Those in which the tonsils are responsible for local disturbances, and (2) those in which they act as a gateway of entrance for a systemic infection. It is sometimes very difficult to come to a decision in the second class of case, and in these a culture taken from the tonsillar crypts may be of assistance. Occasionally, such a culture when tested with the patient's blood will give some biological reaction indicative of an ætiological relation to an existing systemic infection. The principal dangers are those due to the anæsthetic, hæmorrhage, and septic infection, including abscess of lung. The use of chloroform in these operations, even when given by a skilled anæsthetist, is absolutely unjustifiable. Ether given by the open method is the safest anæsthetic, but the writer has seen one case in which serious acidosis followed a comparatively short and light ether narcosis. To guard against this, bicarbonate of soda in large doses should be given

as a routine measure for twenty-four hours before the operation. It has the additional advantage of reducing the vomiting to a minimum, and apparently making the post-operative sore throat less distressing. In spite of many suggestions to the contrary it is very rare for a permanent vocal or other loss of function to occur as the result of a tonsil operation.

*Thomas Guthrie.*

**The Tonsils as an Atrium of Infection in Poliomyelitis.**—E. M. Seydell.  
 "Annals of Otology," xxvi, p. 98.

In the 203 cases studied, tonsils were present in 200. In three cases there was a partial absence of these structures, and in these cases the paralyses were slight and recovery rapid. Dr. Rosenow, in a communication to the author, stated: "I know of two cases that have developed poliomyelitis in whom tonsils and adenoids were presumably properly removed. In one there was only a slight weakness of the shoulder muscles, which disappeared promptly. In the other case the paralysis was slight, even though a brother of the patient, whose tonsils had not been removed, was severely paralysed. I have seen these two cases and have heard of others, and I believe in all cases the paralysis was not marked."

*Macleod Yearsley.*

**Œdema of the Glottis (?) following Tonsillectomy.**—E. Lee Myers.  
 "The Laryngoscope," February, 1917, p. 98.

Myers' patient was a physician who complained of fulness in both ears. The tonsils were buried, the right one having been clipped a few years previously. Upon manipulation some caseous matter was pressed out. The patient was a powerful man of the plethoric type. The left tonsil was removed by dissection with the aid of quinine and urea hydrochloride infiltration. No attempt was made to control the hæmorrhage as the patient wished to lose some blood. The right tonsil was removed according to the same method, but there was slight difficulty in separating it from the posterior pillar, and two or three tags had to be removed with the tonsil punch. Slight arterial bleeding was stopped by torsion. Myers was hurriedly called at midnight on account of the patient's dyspnœa and found him presenting a puffy and anxious appearance. Laryngoscopy showed a turban-shaped epiglottis with infiltration of the glosso-epiglottidean folds. The vocal cords were not involved. The patient was given ice to suck, and an ice pack was applied to the throat externally. A local spray of adrenalin was used, but in spite of this the patient presented the characteristic apprehension met with in laryngeal obstruction. Recovery took place. Myers has noted that after enucleation of buried tonsils with adhesions there is considerable œdema of the uvula and posterior pillars, especially when the patient is full-blooded. He believes that the œdema was due to injury of the soft parts.

*J. S. Fraser.*

**Gumma in Fossa of Rosenmüller, causing Deafness.**—Isaac M. Heller.  
 "Annals of Otology," xxvi, p. 70.

Married woman, aged forty-one. The growth prevented inflation by catheter. Diagnosis lay between malignancy and syphilis. Wassermann was positive. Three injections of 0.45 and 0.60 grm. of neo-salvarsan



were given with intervals of seven days. Sodium iodide and mercury were also given. Reaction was prompt, and after the third injection the fossa was free and hearing equal to that of the opposite ear.

*Macleod Yearsley.*

## NOSE.

**Antral Abscess Treated with Salicylic Acid.**—P. R. Wilde. "Lancet," 1917, vol. i. p. 998.

An elderly lady with an antral abscess which had lasted fourteen years. Daily washed out through permanent tube. Treated by plugging antrum loosely with gauze impregnated by powder of acid. salicyl. 1 pt., sach. alb. 4 pts. Discharge ceased in four days. No further trouble.

*Macleod Yearsley.*

## LARYNX.

**Leeches in the Larynx.**—Navarro. "Revue de Laryng., d'Otol., et de Rhinol.," June 30, 1917.

These occur very frequently in Andalusia, chiefly from June to October, and in field-labourers.

The pathognomonic symptom is hæmoptysis without any interference with the general health. Such symptoms as are especially referable to the larynx vary widely in intensity, from complete absence to a state of imminent asphyxia. In the latter case the unattached end of the animal acts as a valve, lying pendulous in the long axis of the larynx during inspiration, but flapping upwards so as to occlude the glottis during the expiratory blast. There is one sign which is only found occasionally, but which, when it exists, is characteristic; a coarse bruit, caused by the free end of the leech knocking against the glottic walls during expiration.

*Treatment.*—In the removal of a leech, cocaine is dangerous; on the contact of cocaine the leech relaxes its hold and falls into the trachea or bronchi.

Patients acquire a tolerance to leeches in the larynx.

*H. Lawson Whale.*

## EAR.

**Wounds of the External Auditory Meatus.**—Rozier. "Rev. de Laryng., d'Otol., et de Rhinol.," August 15, 1917.

The fissures of Santorini, which normally contribute to the elasticity of the cartilaginous meatus, after an injury become filled by fibrous tissue continuous with the neighbouring perichondrium. And this plays an important part in stenoses of the cartilaginous meatus.

As regards treatment, the results of the author's full analysis of stenoses into annular and tubular, cartilaginous and bony, may be summarised as follows: A crescentic incision is made to encircle the posterior half of the meatus, and, from the centre of this, another is carried horizontally backwards. The resulting flaps are turned up and down, and as much cartilage, or bone, or both, removed as is necessary.

The flaps are stitched into place, and the enlarged canal dressed with gauze plugs. The prognosis is invalidated by a coexistent chronic otitis media.

*H. Lawson Whale.*

**Early Operative Treatment of Chronic Discharge from the Middle Ear.—R. Graham Brown.** "Medical Journal of Australia," July 21, 1917.

Brown begins by stating that the orthodox treatment of suppurative conditions of the middle ear is hopeless. His paper is mainly an exposition of the theories and opinions of Charles Heath, with whom he is in close agreement. He gives a description of the Heath operation and methods of after-treatment. One paragraph leads to the question, is it an exact description of Heath's method? "After controlling all hemorrhage, a careful dissection is made through the deep fascia. The lower border of the sheath of the temporal muscle is defined and left uninjured." Why dissect through the deep fascia when the parts can be separated downwards to the upper margin of the bony meatus without dissecting through the fascia?

*A. J. Brady.*

**Labyrinthine Fistula with Complete Loss of Cochlear Function and Persistence of Normal Vestibular Function.—J. Auerbach.** "Annals of Otology," xxvi, p. 117.

Man, aged forty-three, with left otorrhœa from childhood. Dry for pus five to six years. Seven months before consultation, violent attack of vertigo with vomiting. A full account of the examination is given. The interesting features of the case are: (1) Practically normal vestibular reaction, showing neither an increased nor a diminished static activity. (2) Complete loss of cochlear function, indicating a widespread invasion of the labyrinth at some past period. (3) Question of treatment. The patient was seen by several otologists, who advised a radical mastoid operation. Was this advice justified in the light of the findings? (4) A dry ear with no spontaneous nystagmus, no dizziness, no loss of hearing seems to call for no operative interference. (5) With a recurrent acute infection of the middle ear, causing retention, dizziness, spontaneous nystagmus, and disturbance of equilibrium, a radical mastoid would be in order. In no case should a labyrinth operation be considered, unless intra-cranial complications were threatening or manifest.

*Macleod Yearsley.*

**Salivary Fistula following a Simple Mastoidectomy with Cervical Abscess.—F. C. Schreiber.** "Annals of Otology," xxvi, p. 113.

A rare post-operative sequel. The case, a girl, aged seven, show it in conjunction with facial paralysis, a double catastrophe, regarded by the recorder as unique. She was operated upon for acute mastoid abscess with cervical abscess at the age of two.

*Macleod Yearsley.*

## MISCELLANEOUS.

**Mental Hygiene and Shell-shock during and after the War.—F. W. Mott.** "Brit. Med. Journ.," July 14, 1917.

In his Chadwick Lecture Major Mott defines shell-shock as a term applied to a group of varying signs and symptoms, indicative of loss of

functions and disorder of functions of the central nervous system, arising from sudden and prolonged exposure to forces generated by high explosives.

It is obvious that in modern trench warfare the brain of the soldier is exposed to a constant stream of exciting and terrifying sensory impressions, and that the shell bursting near him merely acts as the last straw on an utterly exhausted nervous system.

The extrinsic conditions of warfare—the unceasing din, the exposure to cold and wet, the gruesome spectacles, the dreads and fears—all undoubtedly predispose to shell-shock: whilst of even greater importance as a predisposing factor are intrinsic conditions, such as a neurotic disposition or an inborn or acquired neuropathic taint.

Aphonia is a frequent symptom, and it differs in no way from hysterical aphonia. Those patients often shout during sleep, and this may be a prelude to the recovery of speech. One man, on being told that he had been talking in his sleep, was so surprised that he said, “I don’t believe it.” In some such cases the fear effect on the conscious mind inhibits the respiratory movements necessary for phonation, and X-ray examination shows that the diaphragm is hardly moving at all. Under such circumstances, breathing exercises may be usefully employed.

Aphonia is often accompanied by deafness, and the patient may recover his speech and yet remain deaf. In only about 17 per cent. of the cases is the deafness really due to ear diseases; in the majority of cases it is purely functional.

The treatment of shell-shock varies according to the symptoms. Insomnia is frequent, and for this the writer has found the continuous warm bath (up to an hour or more) of great value.

Severe cases require quiet repose in single rooms, but the patient should be kept occupied and amused by knitting, basket-making, etc.

Discipline is very essential during convalescence, and diversion of the mind by useful occupation in workshop or garden has been most successful in restoring to health and strength these disabled men.

Douglas Guthrie.

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## REVIEW.

*Injuries of the Face and Jaw and their Repair, and the Treatment of Fractured Jaws.* By P. MARTINIER, Professor of the Dental School of Paris, and Dr. G. LEMERLE, Professor of the Dental School of Paris; translated by H. LAWSON WHALE, M.D., F.R.C.S., Capt., R.A.M.C. Published by Baillière, Tindall & Cox. Price, 5s. net.

This is a small book of 345 pages, by two French dentists, chiefly devoted to consideration of various prosthetic apparatus. There are numberless mechanical devices described, with minute attention to detail, and this alone makes the book a valuable one to surgeons and dental surgeons interested in modern plastic work. The translator, Capt. H. Lawson Whale, has done his work sympathetically in producing a book pleasant to read and easily understood, whilst maintaining the spirit of the original.

The subject of artificial larynges is discussed as fully as is possible in a book of this size, but the descriptions are not very clear, and the whole results are slightly disappointing, inasmuch as no one has yet succeeded in devising an artificial larynx which is popular with the patient.

Some pages are devoted to a description of dentures used after the removal of the upper jaw, and will be familiar to most dentists, but sufficient emphasis is not laid on the necessity for early application of a prosthetic apparatus to be worn by the patient almost immediately after the operation, which makes the stretching of the scar tissue easier, and gives a better final result.

The most striking omission of the book, however, is the fact that no mention is made of the more recent appliances for cases in which the temporo mandibular articulation has been destroyed and the greater part of the ramus has been lost. Again, nothing more artistic than the older apparatus for prosthesis of the nose is described, although it may be true that, at the best, the results in this field are disappointing.

E. D. D. Davis.

## NOTES AND QUERIES.

### THE EDUCATION OF THE OTO-LARYNGOLOGIST.

SIR,—One of these days we shall have Peace. What about that new Heaven and new Earth?

What about the education of the oto-laryngologist?

Is a high qualification in general surgery still to be the only *sine quâ non*, or should we set about agitating for evidence of a thorough education in our special work before admitting any practitioner as an oto-laryngologist?

Even if we did agitate would it make any difference?

The present qualifications in general surgery imply a prolonged and severe disciplinary training in subjects which have very little bearing on oto-laryngology. Does a knowledge of the development of the *Fallopian* tubes, for example, teach a young man how to inflate the *Eustachian* tubes without inducing emphysema?

Should not these high surgical qualifications be modified so that men may be trained as specialists and as such examined? Should not an attempt be made to induce the qualifying bodies to recognise specialties?

The answer authoritatively made to this last question is that the candidate for the higher qualification in general surgery is expected to know, as a specialist knows, the surgery of all the special regions. He *may be expected* to be such a general specialist. But he cannot be. No man can be. Not even the examiners.

Is one and the same candidate ever asked to catheterise the ureters and also to demonstrate to the examiners the endoscopic view of the pyriform sinus in the pharynx? Would the examiner be able to recognise the latter if he saw it?

Those questions are knocking to-day at be-porticoed doors, and are awaiting a reply. Will there be any reply?

The oto-laryngologist should be highly trained in general surgery. Certainly! But must this training be so severe, so prolonged, so



expensive in time and money? (England is going to be very poor.) Must the candidate be so deeply grounded in general embryology and anatomy that he has no time during his budding years to give to original or research work in oto-laryngology?

Did our young men before the war do *any* original work in oto-laryngology? If not, why not?

Shall we expect them to do any research work in our specialty in the future, or must we still go on cribbing from the Germans? Must we still accept our juniors straight from the hands of examiners in general surgery, and call them, after a few months in our clinics, specialists in oto-laryngology?

Perhaps there is not any need for original work in oto-laryngology. Perhaps we know everything that can be known. Perhaps oto-laryngology (in England) is unworthy of ranking any higher than, say, with all respect, proctology.

But suppose the opposite. Suppose that oto-laryngologists are proud of their work; jealous of its high position; ardent for its furtherance; enthusiastic for its future. Suppose that they think that their successors should be trained and examined in oto-laryngology before practising as such in hospital and in private. Suppose that oto-laryngologists should demand from their juniors evidence of original or research work; evidence of special skill in instrumental manipulation; evidence of deep and special knowledge of these regions and their abnormalities and diseases, medical as well as surgical.

Suppose all this, I say, and then let me ask: Can anybody tell us how we can induce our qualifying establishments to recognise these necessities and to act upon them?

PELION.

#### BEAUTIFYING THE RACE.

Dr. A. Keith writes, in reply to our note on the above subject in the March number: "The reports which appeared of what I said—or, rather, did not say—at the Royal Institution are very misleading. It is the adenoid facies which constitutes the essential change in our national physiognomy. The central problem is the cause of adenoids, but the mechanical effects of adenoids, so far as respiration is concerned, do not account for the extraordinary changes which are occurring. As soon as my hands are free I shall write my evidence out in full."

#### DR. HERBERT S. BIRKETT.

Our Canadian *doyen* has not taken a long rest after his three and a half years on the French front. Soon after his return home in February, Dr. Birkett was called to Ottawa, and there informed that the United States Government has asked for his services as adviser to the Medical Services of the U.S. Army. The British Government were very desirous that he should accept this appointment, and at the present moment Colonel Birkett is attached to the British Embassy at Washington, with duty at the great Medical Camp at Fort Riley, Kansas. This appointment is a great compliment, and we particularly appreciate it as an honour to an exponent of laryngology. At the same time it is very gallant of our colleague to so soon take on such a responsible post, and we admire his devotion to the Empire in these critical times.

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**SOME OBSERVATIONS ON THE CLINICAL SIGNIFICANCE  
OF PARALYSIS OF THE LEFT VOCAL CORD.**

BY HERBERT TILLEY, B.S.Lond., F.R.C.S.Eng.,

Surgeon, Ear and Throat Department, University College Hospital, London.

THE following remarks are based on a series of twenty-three cases seen in private practice. In each instance the left vocal cord was paralysed and had the appearance of early abductor or recurrent nerve paralysis, but I have purposely refrained from using these terms in the diagnosis of the lesion, because it will be quite obvious that, in the majority of the patients, such a conclusion would not have been warranted by the history or course of the laryngeal affection.

When a hospital student I was always taught that paralysis of a vocal cord was a symptom of grave significance in that it generally pointed to an aneurysm of one of the large intra-thoracic arteries, to malignant disease of the gullet, or to a mediastinal tumour. In rarer instances such a paralysis might have been met with in a patient suffering from a lesion of the central nervous system such as tabes dorsalis, or from a tumour in the neck which offered a ready explanation of the weakness of the vocal cord consequent upon pressure on one of the recurrent laryngeal nerves. Still less frequently did one hear of peripheral paralysis of a cord due to diphtheria, lead, arsenic, or alcohol, and I do not recollect any mention being made of fixation of the crico-arytænoid joint from inflammatory processes.

Of course, these were days when radiography was unknown, and if it was not possible to establish the presence of an aneurysm or a mediastinal growth by the methods of examination then in vogue, such failure was not considered a sufficient reason for questioning the accuracy of the diagnosis.

We need not seek far for the explanation of such teaching. A patient suffering from one of the affections just mentioned would probably have been admitted for symptoms of greater urgency than some slight alteration in the voice—in fact, such weakness occasionally developed during

a somewhat prolonged stay in the hospital, or, indeed, the immobility of one vocal cord may only have been discovered at the instance of a careful physician who was not forgetful of the importance of examination of his patient's larynx. Hence, when we left the hospital, among the many impressions which we carried away with us was this one—viz. that paralysis of a vocal cord was a serious symptom, and an omen which forebode evil at no distant date.

I think this experience must have been common to most of my senior readers, but if my assumption is wrong, I have little doubt that correction will await me in the correspondence column of this Journal.

To the question, Was our teaching wrong? I would answer, No, but it was incomplete. Twenty years spent in the study of diseases of the throat—using this word in its most widely accepted sense—must convince the least observant that paralysis of a vocal cord is a symptom of arresting significance, that it always demands the most careful investigation, and that it may be the earliest, and for some time the only tell-tale of impending and grave issues. Therefore he will be the wise physician who keeps this aspect of the subject uppermost in his mind when forecasting the future of his patient and suggesting appropriate treatment.

Let me give an instance in point:

Mr. McS—, aged forty-six, consulted me February 17, 1906, for hoarseness of six months' duration. Examination showed abductor paralysis of the left vocal cord. He had no symptoms beyond the one mentioned. I wrote to his doctor, and suggested the possibility of aneurysm of the aorta and advised that treatment should be carried out from that point of view.

Here is the last report of the case:

April 12, 1918.

DEAR MR. TILLEY,—Miss McS— handed me the letter from you some time back addressed to her late brother asking him to report progress to you. I sent him to you in 1906 on account of the state of his larynx. You were quite correct in the diagnosis you made, although his symptoms were for a long time obscure. He ultimately developed unmistakable signs of aneurysm of his descending and arch of the aorta. I adopted the usual treatment. Restricted diet, iodides, absolute rest, etc.; this he continued for more than six months and proved himself a most excellent patient. He had no distressing symptoms. At the end of this period, after explaining the position and he fully realising it, he was allowed to sit up occasionally and occasionally was carried to and taken out in a bath-chair. There was nothing to indicate—except the physical signs—any alteration or change in his state. But he died, as I expected, whilst sitting in his chair by himself, from rupture into the bronchus. There was no *post-mortem*. I cannot lay my hand on the exact date of his death, but it was within the year of seeing you.

Very truly yours,

J. L. W.

Here, then, was an obvious case of abductor, or recurrent paralysis of the left vocal cord caused by an aortic aneurysm, and it substantiated the teaching which we had received.

But, as already hinted, many cases are to be met with in which the laryngeal appearances are identical with that just recorded, and yet the patients may be otherwise in perfect health and even recover the action of the vocal cord. It is this class of case which proves that the education of our student days did not carry us quite far enough, and it is the object of this brief communication to widen our perspective of the subject of laryngeal paralysis, and more particularly when the paresis affects the left vocal cord.

Before referring to the cases, I should like to point out that when there was any doubt as to the cause of the paralysis the patient

was referred to a specialist in diseases of the chest, or of the nervous system, and in the majority of them the advantages of radiography were not lost sight of.

Of the twenty-three cases to be considered I obtained no reply, or only indirect or unsatisfactory information from ten, *e.g.* one was an Austrian who had left "destination unknown." I saw him in 1910. He was sixty-seven years old, and to my knowledge was playing golf in 1915. Another, a "prisoner of war in Germany," a third lived (seen in 1912) in a boarding-house and has probably "moved," a fourth was a German, a fifth is "somewhere in the Argentine," etc.

Six patients have completely recovered the use of the cord.

Three patients have died.

Four remain *in statu quo ante*.

*Patients who have Recovered from Paralysis of the Left Vocal Cord.*

(1) Mrs. O. T—, aged thirty-six, consulted me on February 10, 1908, for loss of her singing voice and inability to speak plainly. The symptoms had lasted a fortnight. Examination: The left vocal cord motionless in the middle line. No swelling of the corresponding crico-arytænoid region. I could detect no physical signs in the chest, and as she was a relation of Sir John Broadbent I referred her to him for an examination of the chest. He reported that everything was normal. Some twelve months later I saw the patient for another matter, and found the voice had returned and the action of both cords were quite normal.

(2) Mr. F. W. W—, aged fifty-three, consulted me on February 19, 1910, for loss of voice of two months' duration, which dated from "a touch of influenza." No other local or general symptoms were discovered. Examination: March 11, 1918. Both vocal cords normal in action and appearance. The patient says the voice returned two to three months after his first visit to me.

(3) Mr. S. W—, aged forty-nine, consulted me July 7, 1913, for loss of voice. Examination showed the left vocal cord in the position of adduction. No physical signs in chest and no evidence of any central nerve lesion. Re-examination: December 19, 1913. Vocal cords normal. I happen to know that the patient is still well and in full work as a solicitor.

(4) Mr. H. O. S—, aged sixty-seven, consulted me on June 21, 1915, for loss of voice of three months' duration. It came on after shouting. Examination: On phonation the left vocal cord remains motionless in the middle line. No physical signs in chest and no evidence of any central nerve lesion.

In answer to a recent letter from me he replies as follows:

March 5, 1918.

MY DEAR DOCTOR,—I am in receipt of yours dated the 4th inst. I have often thought of writing you, or calling to see you when in town, but I am seldom there, only two or three times since my visit to you, my time usually being short and much to do in munition matters.

Answering your inquiry I am delighted to tell you that my throat trouble has got all right, in fact, quite normal, so that I can now talk or sing as well as ever.

I was for a time a bit of a mystery to my family and friends as all thought I had lost my voice entirely. Your remarks, however, gave me a ray of hope, when you said that I had a good constitution, and that my voice may return again.

As I told you at the time I had seen a number of medical men and specialists, and went through all sorts of treatment, each doctor in turn advising, of course, his own medicine, but all with no result. I then came to you, your advice was "No medicine—no treatment." I asked if douching the throat frequently with cold water and applying a cold water pad at night would be in any way harmful, you said "No, but it may be beneficial," I therefore did this, and also gargled the throat night and morning with cold water.

As to whether all this had any effect in my case you will know best, but in about three months after seeing you I began to get better, and, with still applying the cold water, at about the end of four months I was quite well. Altogether, I was without my voice for about eighteen months.



One specialist said he was afraid that my voice was gone for ever, but your straight, candid, and hopeful opinion gave me courage which probably played some little part towards my cure, anyhow, my many thanks have been offered to you many times since.

My loss of voice was rather sudden, all occurring in a few hours, but the recovery was far more gradual, three or four weeks.

If I have not made myself clear write me again.

Faithfully yours,

H. O. S.

*Three Patients who have Died.*

(1) Mr. T. A.—, aged seventy-six. Seen August 16, 1913. Died of pneumonia, 1916. His daughter writes, on March 6, 1918: "I write to say he died in 1916. He had pneumonia, and was ill only a few days. I am pleased to inform you that your treatment of his throat was a great success, and his voice returned, and he enjoyed good health after."

His doctor wrote, April 8, 1918: "There was no reason to suspect aneurysm or intrathoracic growth."

Probably we might have included this patient in the list of those who recovered from the laryngeal weakness.

(2) Mr. A. E. R.—, aged fifty-seven. Seen May 1, 1908. Hoarseness three months. History of chest trouble and hæmoptysis. Examination: "Paralysis of left vocal cord." Died July 6, 1908. Could obtain no details. Probably the immobility of the vocal cord was due to tuberculous disease of the crico-arytenoid joint.

(3) Mr. McS — (*vide supra*).

*Four Patients in statu quo.*

Mr. H —, aged seventy-two. Seen December, 1915. The region of the left crico-arytenoid joint appears to be swollen when compared with the right. Re-examination April, 1908: *In statu quo*. General health good.

Mrs. S —, aged twenty-nine. Seen February 3, 1915. Paralysis of left vocal cord, which is motionless in middle line. Re-examined April 9: *In statu quo*. This patient is a particularly healthy woman.

Miss M —, aged twenty-seven. Seen November 4, 1916. Left vocal cord in position of adduction and motionless on phonation. Re-examined April, 1918: *In statu quo*.

Col. J —, aged fifty-seven. Seen in 1916. Paralysis of the left vocal cord. He writes, May 7, 1918: "The throat has not troubled me at all, and my voice is becoming stronger, although it is still very hoarse and indistinct, and on a very windy or damp day more resembles a ghastly whisper than anything else."

It will be obvious now why I refrained from using the terms "abductor" or "recurrent paralysis" in the title of my communication. Only in the first case (Mr. McS —) could I have been fairly certain that the paralysis of the left vocal cord was due to pressure on the recurrent laryngeal nerve. In the twenty-two remaining patients the vocal cord had all the appearances of early abductor palsy, but it would be "begging the question" (or the diagnosis) to assert that—in the absence of any confirmatory symptoms—the weakness was due to failure of abductor impulses.

This consideration naturally raises the question—Is true abductor paralysis ever recovered from? My experience tempts me to reply, "The answer is in the negative," but I should be glad to be convicted of error.

We should scarcely expect restoration if the laryngeal paralysis was a symptom of tabes, or even if it had been caused by an aneurysm which had since undergone cure. Furthermore, I have seen non-malignant tumours in the neck (associated with recurrent paralysis of a cord) skillfully removed without further damage to the nerve, and yet the mobility of the cord has never returned.

One is, therefore, led to the conclusion that, with the possible

exception of a small number of paralyses due to peripheral neuritis, abductor paralysis, when once established, is likely to be permanent.

If this be granted, then in six out of my twenty-three cases the temporary fixation of the left vocal cord in the position of adduction must find an explanation other than that caused by involvement of the recurrent laryngeal nerve.

I am inclined to think that the solution of the question will be found to lie in inflammatory conditions of the crico-arytænoid joint. The following amongst other experiences have constrained my opinion to this end:

Dr. S—— consulted me about pain in his throat, which was accentuated by swallowing, and at the same time his voice had suddenly become husky. There was slight dyspnoea and stridor on exertion. His temperature was 101.4° F., and some of the larger joints were painful on pressure. Examination of the larynx showed a tumefaction of the left arytenoid region and fixation of the vocal cord in the middle line. He passed through a sharp attack of rheumatic fever, which was treated by rest, full doses of salicylates, etc. I saw him two months later, when the larynx was normal and his voice had returned.

W. J——, aged thirty-five, came to a hospital where I was house-surgeon. He was suffering from such extreme dyspnoea that an immediate tracheotomy was performed without any general or local anæsthesia. A few days later, when his larynx was examined, both vocal cords were seen to be fixed in the position of adduction. Further examination failed to find any central nerve lesion or any peripheral factor involving the recurrent laryngeal nerves. This happened twenty-five years ago, and to-day the man is in excellent health, still wears his tracheotomy tube, and keeps a flourishing coffee-stall in a small street near Oxford Street.

Dr. H——, aged sixty-eight, consulted me for loss of voice. His left vocal cord was motionless in the middle line. There was a history of syphilis and patches of leucoplakia on the tongue. The left arytenoid was slightly fuller than the right. After appropriate treatment for six months I examined the larynx again, and found it normal in every respect and his voice correspondingly improved.

I need not multiply such cases, for all laryngologists must surely be able to recall similar instances. I introduce them only to give reasons for the faith that is in me—viz. that uni- or bilateral paralysis of the vocal cords does not necessarily mean that the lesion is due to involvement of the origin or course of the recurrent nerve however much the appearances may suggest such a diagnosis.

The differentiation of the two types is of the utmost importance from the point of view of prognosis. When the paralysis is due to failure of abductor impulses, the outlook is only too often serious because the primary lesion is irremediable—*e.g.* central nerve lesions, intra-thoracic aneurysms, or new growths. In a small residue of cases such as tumours in the neck, while life may not be threatened, the disabilities due to paralysis of the vocal cord are nearly always permanent.

Can we make a diagnosis between true abductor palsy and immobility of the vocal cord due to inflammation of the crico-arytænoid joint? Not always. In a given case the accompanying symptoms may render it easy to establish the cause of the paralysis—*e.g.* in œsophageal carcinoma, with its attendant wasting and increasing difficulty in swallowing. The results of radiography or of peroral endoscopy may confirm our suspicions. In aneurysm of the aorta we should be guided by the symptoms, physical signs, and again radiography may be of invaluable assistance. In a central nerve lesion the laryngeal palsy would probably be accompanied, or shortly followed by other manifestations of the graver disease.

On the other hand, when the immobility of the cord is due to an

acute inflammation of the crico-arytænoid joint (*vide supra*), the relationship between cause and effect is obvious.

Difficulty in diagnosis will arise in the earlier phases of abductor paralysis when the physical signs of the primary lesion are not easy to detect—*e.g.* a small aneurysm in the concavity of the aortic arch, the early stages of a mediastinal growth, a pleuritic adhesion involving the recurrent nerve in the neighbourhood of right pulmonary apex, the incipient phase of certain cases of tabes, etc.

In the mechanical type of case—*i.e.* where the cord is motionless because of the fixation of its corresponding crico-arytænoid joint—we may not see the case till all signs of inflammation in the joint have passed off, and there may be nothing in the history of the onset or course of the trouble to indicate a mechanical cause of the immobility of the cord.

It is in such cases as these that a searching examination, coupled with well-balanced judgment should enable us to arrive at a fairly accurate conclusion.

One fact has struck me in reviewing the cases on which this paper is based, and I am bound to confess that I do not grasp its significance. In every instance it has been the left vocal cord which has been immobilised, including those cases which recovered. Can it be that they are not all due to involvement of the crico-arytænoid joint, and is it possible that a peripheral neuritis of unknown origin will explain better the temporary immobility of the cord?

#### CONCLUSION.

The object of this short communication will have been achieved if I have been able to extend the horizon of the reader with regard to the prognosis in certain cases of paralysis of the left vocal cord. When we find that it remains motionless in the middle line on phonation and an exhaustive examination fails to reveal any gross lesion in the origin or course of the recurrent laryngeal nerve, we should have sufficient confidence in our opinion to say that recovery is not out of the question, to feel that we are not justified in assuming the "black cap," and thus unnecessarily condemning the patient to a life of inaction and all the evils which this may bring in its train.

### INTRINSIC CANCER OF THE LARYNX AND THE OPERATION OF LARYNGO-FISSURE,

WITH A DESCRIPTION OF SOME NEW INSTRUMENTS SPECIALLY DESIGNED FOR IMPROVING THE TECHNIQUE.

BY IRWIN MOORE, M.B., C.M. EDIN.,

(Continued from p. 143.)

Surgeon to the Throat Hospital, Golden Square, London, W.

Thyro-fissure for papilloma is not nowadays employed on account of repeated recurrence; direct laryngoscopy and endoscopic removal has taken its place.

Semon<sup>1</sup> reports a case in which 17 thyro-fissures were performed for papilloma on the same patient with failure to cure.

<sup>1</sup> "Proc. Laryngol. Soc. Lond.," 1894, p. 62.

Morell Mackenzie,<sup>1</sup> in 1871, also summarised all the cases of thyrotomy—28 in number—performed up to 1869, of which only 6 were malignant, and he compared the merits of this operation in relation to life and recurrence of growth with 100 consecutive cases he had treated endo-laryngeally—of which 93 were benign. He states that in the 28 cases of thyrotomy—of which 6 were malignant—9 patients died, and there was recurrence in 6 cases, whilst not one of the 93 benign cases treated through the natural passages terminated fatally, and recurrence took place in only 6 cases. Out of the total 100 cases, there were only 4 malignant cases and only 2 cases terminated fatally. Thyrotomy was performed in 3 of these cases, 1 being malignant, and death followed eight months after operation, this being the only case amongst the 3 thyrotomies.

Later, in 1873,<sup>2</sup> he republished these statistics along with other cases recorded up to date, 48 in all, of which 7 were malignant. He states that of these, absence of recurrence occurred in only 14·58 per cent. of cases, whilst recurrence occurred in 22·91 per cent., and death from operation in 8·33 per cent.

Morell Mackenzie described the operation as a very serious one as regards danger to life and destruction of function of the voice.

Timothy Holmes<sup>3</sup> also expressed the opinion that it was a very serious surgical procedure and it ought to be reserved for cases of proved necessity.

Billroth<sup>4</sup> (Vienna), between 1870 and 1884, performed laryngo-fissure on 8 cases of laryngeal cancer—in 1 there was no recurrence after two years and nine months, in another case the after-history was wanting, and the other 6 died of recurrence (Salzer, Vienna).

Billroth,<sup>5</sup> in eighteen years between 1870 and 1888, performed 10 laryngo-fissures for laryngeal cancer. Death followed operation in 3 cases (3 per cent.), recurrence in 4 (40 per cent.), whilst there were only 3 cures (30 per cent.) (Chiari).

Paul Bruns<sup>6</sup> (Berlin), in 1878, published an account of 19 cases of malignant disease treated up to this time by thyrotomy, which showed that the results were most unsatisfactory. Two patients died shortly after the operation, local recurrence occurred in 14 immediately or a few months after operation—in 1 case there was recurrence in one year—and in 1 case death occurred twenty-two months after operation from cancer of the kidney, whilst there was no trace in the larynx itself. The results were not reported in 3 cases. Summary—only 2 survived a year.

Bruns drew the following conclusion: "That the attempt at radical extirpation of cancer by means of thyrotomy has proved itself completely unsatisfactory and worthless."

These bad results were due partly to the operation being performed in advanced and unsuitable cases, and partly to faulty technique. Again, this operation was performed in many cases by the general surgeon and

<sup>1</sup> "Growths in the Larynx," 1871, p. 92.

<sup>2</sup> "Dis. of Throat and Nose," 1880, i, p. 327. "The Results of Thyrotomy for the Removal of Growths from the Larynx," *Brit. Med. Journ.*, 1873, i, pp. 458 and 486.

<sup>3</sup> *Brit. Med. Journ.*, 1873, i, p. 531.

<sup>4</sup> Salzer, Langenbeck's *Arch. f. Klin. Chirurgie*, 1885, xxxi, p. 848. Quoted by StClair Thomson, "Dis. of Nose and Throat," 1916, p. 492.

<sup>5</sup> Chiari, "Trans. Amer. Laryngol. Soc.," 1909, p. 20.

<sup>6</sup> "On the Relative Merits of Endo-laryngeal Treatment and Thyrotomy," Berlin, 1878, p. 73.



not by the experienced and skilled laryngologist. In these early days the majority of cases died from causes directly attributable to the operation and its sequences, such as septic pneumonia or bronchitis. In consequence of Bruns and others denouncing thyro-fissure, the following ten years, *i. e.* from 1878 to 1888, the operation was almost abandoned in favour of laryngectomy, and only 11 cases of laryngeal cancer were treated by thyro-fissure (Semon).<sup>1</sup>

The position of malignant disease of the larynx during this decade may be gathered from the opinion expressed by J. Nolan Mackenzie<sup>2</sup> (Baltimore), in 1916, when looking back on the work at the Golden Square Throat Hospital in the seventies and early eighties of last century. He says: "There was but one disturbing and discordant memory in the treatment of cancer of the larynx, viz. the piecemeal removal of the growth through the natural passages which to-day would be considered as a means of slow death. The growth was stimulated at once into much quicker activity, the patient naturally became much worse, and was sent to his long home much earlier than if he had been left severely alone. There was never a thought of a cure."

The first great exponent of this operation was Arthur Durham, and if his advice and experience had been followed in place of the condemnatory opinions of Bruns, Billroth, and Morell Mackenzie, etc., this operation would not have fallen into such complete abeyance and discredit until revived by Butlin and Semon in 1890; for Durham,<sup>3</sup> as long ago as 1872, in referring to this operation, remarked: "A just estimate of the general and special merits of the operation of opening the larynx by section of the cartilages in order to facilitate the removal of morbid growths can only be obtained by personal experience, or by the careful study of the recorded experience of others, and he had come to the following conclusions, viz. that the danger and difficulties attending it are neither so numerous nor so considerable as have been represented and commonly supposed, and that the success hitherto achieved has been so marked and so indisputable as to justify and encourage in any such cases as may seem appropriate, an earlier, bolder, and more ready resort to this method than has hitherto prevailed."

Butlin, in 1883,<sup>4</sup> collected together from various sources 50 cases of carcinoma and 23 of sarcoma of the larynx; of the latter, 17 were intrinsic, 3 were extrinsic, and 3 of uncertain origin. He referred to the cases collected by Morell Mackenzie and treated by endo-laryngeal methods, and considered that too favourable a view had been taken of these cases. At this time Butlin's opinion inclined towards hemilaryngectomy and laryngectomy, as shown by the following views: He says "not the slightest encouragement is afforded by published accounts to induce one to perform the operation of thyro-fissure, or the sub-thyroid incision, for the removal of carcinoma whether extrinsic or intrinsic." He also remarks that malignant disease of the larynx does not appear to infiltrate so deeply or spread so rapidly, and it usually runs its course without affecting the lymphatic glands. It is, therefore, amenable to treatment by complete removal of the part from which it grows which may necessitate partial or complete eradication."

Semon, in 1886, drew attention to some important points in the practical diagnosis of *early* malignant diseases of the larynx, which

<sup>1</sup> Cited by Shurley, "Dis. of Throat and Nose," p. 593.

<sup>2</sup> *Ann. Otol., Rhinol. and Laryngol.*, March, 1906.

<sup>3</sup> "Trans. Med. Chir. Soc.," 1872, lx, p. 38.

<sup>4</sup> "Malignant Dis. of the Larynx," 1883, pp. 57-63.

resulted in Butlin recommending that thyro-fissure should be reinstated in its place.

Butlin<sup>1</sup> first began to perform thyro-fissure for cancer of the larynx in 1886, and from 1890 he confined himself entirely to intrinsic cases. Up to 1890 he had performed ten operations on nine patients conjointly with Semon, of whom one-third died of the operation, one-third of recurrence, and the remaining third sufficient time had not elapsed since operation to claim success.

Butlin, up to 1894 operated on 14 cases, of which 2 (14·3 per cent.) died from the operation, 6 relapses (43 per cent.) occurred, whilst there were 6 cures (43 per cent.), made up of 3 relative and 3 definite cures<sup>2</sup> (Chiari).<sup>3</sup> Between 1890 and 1907<sup>4</sup> he had performed 23 thyro-fissures on 21 patients, with only 1 death, 10 of which cases were quite successful.

Delavan<sup>5</sup> (New York), in referring to the general statistics up to 1904, says that permanent cures were as high as 44 per cent., while the death-rate could be placed at about 11 per cent. He finds, however, that nearly 70 per cent. of Butlin's cases lived for more than 3 years after operation, whilst his deaths from operation were 9·5 per cent.

Butlin lost no case from operation after 1899.

Semon<sup>6</sup> first carried out this operation independently of Butlin in 1891. Between 1886 and 1896 he had operated on 8 cases, of which 2 (25 per cent.), died from the operation; there were 2 (25 per cent.) recurrences and 5 cures (62·5 per cent.), made up of 50 per cent. relative and 12·5 per cent. definite cures.<sup>7</sup> Between 1891 and 1904 he had operated on 20 cases, of which 1 died from operation (5 per cent.), and 2 recurrences occurred (10 per cent.), whilst his cures showed an increase to 17, *i. e.* 85 per cent. were well (Chiari).<sup>8</sup>

In 1907 Semon<sup>9</sup> had operated on 33 cases (25 cases being of undoubted malignancy), and his results showed a "lasting cure" in 80 per cent. There were 13·6 per cent. recurrences with 8·8 per cent. fatal results. Semon's last fatal case from operation was in 1894.

The period since 1890, owing to the diagnostic skill of Semon and the operative skill and technique of Butlin, was one in which great advances were made, resulting in this operation being reinstated in its proper place.

Sendziack<sup>10</sup> (Warsaw), reviewed, in 1897, the general statistics of laryngo-fissure, and showed that out of 85 cases (92 laryngo-fissures) operated on between 1851 and 1894-9 (9·8 per cent.) deaths followed the operation; there were 49 (53·3 per cent.) recurrences, insufficient observation in 8 cases (8·7 per cent.), and cure in 21·7 per cent., made up of 13 per cent. relative and of 8·7 absolute cures. Delavan,<sup>11</sup> in revising these statistics, gives the period as between 1876 and 1894. Again, in 1899, Sendziack reviewed 136 cases from 1851 to 1907, which showed 25 per cent. of cures. Later, in 1908, he refers to 214 cases, from 1888

<sup>1</sup> "Trans. Med. Soc. Lond.," 1907, xxx, p. 140.

<sup>2</sup> *Relative cure, i. e.* no recurrence for one year. *Definite cure, i. e.* no recurrence after three years.

<sup>3</sup> Chiari, "Trans. Amer. Laryngol., Rhinol., and Otol. Soc.," 1909, p. 20.

<sup>4</sup> "Trans. Med. Soc. Lond.," 1907, xxx, p. 141.

<sup>5</sup> "Trans. Amer. Laryngol. Assoc.," 1904, p. 155.

<sup>6</sup> "Trans. Med. Soc. Lond.," 1907, xxx, p. 140. *Laryngoscope*, 1903, xiii, p. 887.

<sup>7</sup> *Archiv für Laryngol.*, 1897, vi, p. 375.

<sup>8</sup> "Trans. Amer. Laryngol., Rhinol., and Otol. Soc.," 1909, p. 20.

<sup>9</sup> "Trans. Med. Soc. Lond.," 1907, xxx, p. 127.

<sup>10</sup> Chiari, *op. cit.*, 1909, p. 21.

<sup>11</sup> *Journ. of Laryngol., Rhinol., and Otol.*, 1900, xv, p. 651.

to 1907, which showed 50 per cent. of cures, the death-rate from operations falling from 9·8 per cent. to 2·4 per cent.

Schmiegelow<sup>1</sup> (Copenhagen), in 1897, gave the statistics of 49 cases from 1890 to 1896, in which there were 7 deaths (14·3 per cent.) from operation, and recovery took place in 56 per cent. of cases made up of relative recovery, 21 cases (42·6 per cent.) and definite recovery in 7 cases (14·3 per cent.) cases.

Recurrence occurred in 14 (28·5 per cent.) cases.

Clinton Wagner<sup>2</sup> (New York), in 1900, reported 15 thyro-fissures, 4 of which were malignant; 5 of these patients were then living at periods of 1 year, 12 years, and 17 years respectively; of those not then living, one survived 2 years, one 3 months, and one 10 weeks, and in none of these cases was death due to the operation of thyro-fissure. The name of Clinton Wagner has been linked with that of Butlin in considerably developing and simplifying the method of performing this operation.

D. Bryson Delavan<sup>3</sup> (New York), in 1900, collected the statistics of laryngo-fissure in the case of 7 operators, viz.: Von Bergmann (Berlin), Kocher (Berne), Mikulicz (Breslau), Butlin, Chiari (Vienna), Schmiegelow (Copenhagen), and Semon, and found that out of 50 cases there were 9 deaths from operations (18 per cent.), 39 (78 per cent.) (result of 2 cases not reported) recovered from the operation, whilst 6 (12 per cent.) died from pneumonia, 9 (18 per cent.) from recurrence, and 1 (2 per cent.) from sepsis; 16 (32 per cent.) were well over 2 years.

Chiari<sup>4</sup>, in referring to these statistics, gives 35 recoveries (70 per cent.) made up of 23 (46 per cent.) relative recoveries, *i. e.* no recurrence for 1 year, and 12 (24 per cent.) definite recovery, *i. e.* no recurrence after 3 years.

Frank Hartley<sup>5</sup> (New York), in 1902, reviewed the literature of thyro-fissure from 1832 to 1902.

Chiari<sup>6</sup> (Vienna), in 1909, reviewed the general statistics of laryngo-fissure, and refers to 99 cases between 1895 and 1908. Of these 5 (5 per cent.) died from the operation, 19 (19 per cent.) from recurrence, insufficient operation in 23 (23·3 per cent.); whilst the cures amounted to 52·4 per cent., made up of 33·3 per cent. relative and 19·1 per cent. absolute cures. He also gives his own personal statistics of 4 cases of laryngo-fissure for intrinsic cancer of the larynx from 1894 to 1907. Death followed operation in 3 cases (75 per cent.), recurrence in 11 (27 per cent.); whilst he divided the "cures," amounting to 36·75 per cent., into relative 9·75 per cent., and definite 27 per cent. In 12 cases (29·2 per cent.), there had been too short an observation period.

Chevalier Jackson<sup>7</sup> (Pittsburgh), in reporting his results up to 1913, says that out of 27 cases, 24 were free from recurrence at the end of the first year, 3 died of recurrence, and that he had no operative mortality.

StClair Thomson, between 1900 and 1917, has also achieved successes,

<sup>1</sup> *Ann. des Mal. de l'Or*, April, 1897. Cited by Chiari, "Trans. Amer. Laryngol., Rhinol., and Otol. Soc.," 1909, p. 21. Cited by Delavan, *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1900, xv, p. 651.

<sup>2</sup> Quoted by Shurley, "Dis. of Throat and Nose," p. 592.

<sup>3</sup> Delavan, "A Consideration of the Statistics of the Operation for the Relief of Malignant Disease of the Larynx," *New York Med. Journ.*, 1900, lxxii, p. 449. Abstract, *JOURN. LARYNGOL., RHINOL., AND OTOL.*, 1900, xv, p. 649.

<sup>4</sup> Chiari, "The Treatment of Cancer of the Larynx," "Trans. Amer. Laryngol. Assoc.," 1909, p. 19.

<sup>5</sup> *New York Med. Journ.*, 1902, lxxxvi, p. 1020.

<sup>6</sup> "Trans. Amer. Laryngol., Rhinol., and Otol. Soc.," 1909, pp. 18 and 21.

<sup>7</sup> "Peroral Endoscopy and Laryngeal Surgery," 1915, p. 657.



which yield a permanent cure in 80 per cent. of cases. In his first series<sup>1</sup> of 10 cases, between 1900 and 1910, he reports that only one patient died from local recurrence, and the death-rate from operation was *nil*! In the only two patients in which there was local recurrence the disease reappeared within the year following the operation.

He had performed<sup>2</sup> thyro-fissure, up to date, on 35 patients for intrinsic cancer of the larynx. In 3 the patients were females and in 32 males. The ages of the patients varied from forty-four to seventy-five years. There were no operative deaths.

Twenty-eight cases were "relative cures"—*i.e.*, no recurrence for one year (80 per cent.). Fourteen of these were well 3 years after the operation; one of them is well 10 years after operation. Some of the others, being elderly subjects, have died of other complaints.

In 6 cases there was recurrence of the growth within a year.

In all cases a tracheotomy was performed first, but in many instances the tube was removed at the end of the operation.

#### SUMMARY OF THE RESULTS OF THYRO-FISSURE AND COMPLETE LARYNGO-FISSURE.

A comparison of these statistics of different operators show that the results have greatly improved during recent years. From 1851 to 1894 the percentage of cures was only 22 per cent. and recurrence in 20 per cent. of cases.

From 1888 to 1894 the percentage of cures increased to 50 per cent., whilst recurrence remained at 20 per cent.

Since 1894 the percentage of cures varied from 52 per cent. to 80 per cent., whilst recurrence varied from 19.1 per cent. to 13.6 per cent. (Chiari). Since 1904 the death-rate from operation in experienced hands has been reduced to *nil*.

It would appear that the percentage of cures still vary with different operators from 25 to 80 per cent., owing probably to imperfect technique, or to operating on unsuitable cases, whilst Chiari<sup>3</sup> says that personal statistics show the results to be so exceedingly variable that the percentage of death varies from 0 to 25, recurrence from 0 to 92, and cure from 7.7 to 87.

These later statistics show the enormous progress in the hands of the skilled and experienced specialist over the results of 25 years ago. Nowhere in the whole of the realm of the surgery of malignant diseases, says Chevalier Jackson,<sup>4</sup> have such results been obtained. This success is due partly to the earlier diagnosis of the disease and partly to improvement in operative procedure.

While diagnosis and technique have improved, there still remains room for a better instrumentarium. Just as in endoscopy the wise selection of instruments may be a great factor of success, so in this operation of thyro-fissure it is important that suitable instruments should be used if we are to attain the best results. The instruments<sup>5</sup> which I

<sup>1</sup> "Trans. Med. Soc. Lond., 1912, p. 200. *Brit. Med. Journ.*, 1912, 1, p. 355. *Lancet*, 1912, 1, p. 504.

<sup>2</sup> Verbal communication to author of cases to be published *in extenso*.

<sup>3</sup> "Trans. Amer. Laryngol., Rhinol. and Otol. Soc.," 1909, p. 22.

<sup>4</sup> "Peroral Endoscopy and Laryngeal Surgery," 1915, p. 650.

<sup>5</sup> Shown at the Laryngological Section, Royal Society of Medicine. See "Proc. Roy. Soc. Med.," 1915, ix (Laryngol. Section), pp. 34-36; also Irwin Moore, "The Operation of Laryngo-fissure: Some New Instruments specially designed for Improving the Technique," *Lancet*, 1916, ii, p. 675.



have designed for this operation have been for some years in use, though they have not yet been formally introduced to the profession, since it was my desire that they should first stand a fair trial. They are now used and recommended by StClair Thomson<sup>1</sup> and other of my colleagues.

References to medical literature and reports of cases show that the work of Butlin and Semon in this country has been ably followed up by StClair Thomson, Tilly, Lambert Lack, Douglas Harmer, Dundas Grant, William Hill, Dan Mackenzie, Logan Turner, Brown Kelly, William Milligan, Richard Lake, De Santi, Cathcart, Barwell, Jobson Horne, and others in this country. Whilst abroad by Solis-Cohen, Delavan, Chevalier Jackson, Clinton Wagner, Chiari, Koshier, Schemiegelow, Moure, and others.

The object of this article is to embody the practical experience accumulated as a result of co-operation with my colleagues in over forty laryngo-fissures in this country during the past twelve years, also to enumerate the various up-to-date developments and improvements which have been found of service in increasing the successful results of this operation, and in reducing the death-rate.

### Indications for Laryngo-Fissure.<sup>2</sup>

1. Exploratory purposes.
2. Removal of foreign bodies in the larynx, when found impossible *per vias naturales*, by an experienced specialist.
3. Injuries to the larynx—to avoid the troublesome results of serious lesions.
4. Laryngocele.
5. Stenosis of the larynx from congenital webs and from chronic inflammatory lesions.
6. Acute laryngeal perichondritis.
7. Laryngeal tuberculosis (including lupus).
8. Scleroma of the larynx.
9. New growths in the larynx.
 

<ol style="list-style-type: none"> <li>(a) Benign (extirpation of large benign tumours in which intra-laryngeal treatment has failed).</li> <li>(b) Malignant</li> </ol>	}	Indications for rare.
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It is with the operation of laryngo-fissure for intrinsic cancer of the larynx that this paper specially deals.

*Certain details in the technique have an important bearing on the immediate and after-results of the operation, and it is well to consider them under the following headings:*

1. Preparation of the patient for operation.
  - (a) Preliminary hypodermic injection of narcotics.
  - (b) Intradermic injection of cocaine or its substitutes in the middle line of the neck.
2. Choice of general anæsthetic.
3. Posture of the patient during operation.
4. Cutaneous incision and dissection of pre-laryngo-tracheal region.

<sup>1</sup> "Intrinsic Cancer of the Larynx after Operation by Laryngo-fissure," "Proc Roy. Soc. Med.," 1915, ix, (Laryngol. Section), p. 8.

<sup>2</sup> Semon, "Indications for Thyrotomy," 13th Internat. Med. Cong. (Paris), Aug., 1900. Abstract, JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1900, xv, p. 504. Urñuela (Madrid), "Indications for and Technique of Thyrotomy," 13th Internat. Med. Cong. (Paris), Aug., 1900. Abstract, JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1900, xv, p. 612.

5. Puncture injection of cocaine into the trachea preliminary to tracheotomy, also into the larynx preliminary to fissure.
6. Temporary tracheotomy.
7. Division of the thyroid cartilage.
8. Swabbing of interior of the larynx with cocaine.
9. Tamponage of trachea above tracheotomy tube.
10. Examination of interior of larynx.
- Inspection and palpation of the growth
11. Subperichondrial resection of the growth.
  - (a) Separation of the perichondrium from the inner surface of the thyroid cartilage.
  - (b) Parallel horizontal incisions, first below and then above the growth, with scissors.
  - (c) Separation of the mass from the arytaenoid region.
12. Stoppage of bleeding.
13. Closure of the larynx and neck wound.
14. Removal of the tracheotomy tube.
15. Post-operative posture, and after-care of the patient.
16. Result of operation as regards recurrence and voice.

#### PREPARATION OF PATIENTS FOR OPERATION.

The rules of strict aseptic surgery should be carefully observed both before and during the operation. Although complete asepsis cannot be obtained, yet endeavours should be made to procure it as perfect as possible. The mouth should be carefully examined and all decayed teeth or stumps removed, whilst special attention should be given to the toilet of the mouth for at least forty-eight hours before operation, antiseptic washes being freely used. It is advisable to cut off all tobacco and alcohol for at least a week beforehand.

Patient should be placed in a nursing home or hospital at least twenty-four to forty-eight hours before the time of operation and be prepared in the usual way for the anæsthetic. A purgative should be administered two nights before the operation, followed by a saline purge next morning, so as to avoid unnecessarily disturbing the patient on the morning of the operation. The importance of preliminary purgation in eliminating toxins from the alimentary canal and system prior to this operation has been repeatedly drawn attention to by writers.

#### PRELIMINARY HYPODERMIC INJECTION OF NARCOTICS.

Preliminary narcotics not only encourage quiet induction of anæsthesia, which means less straining and congestion, but also diminish surgical shock, especially in the case of patients who are frightened or of a highly nervous temperament. By their calmative influence patients may be entirely freed from the fear and nervous tension which generally precedes an operation.

Crile (Cleveland, Ohio) says: "We should obliterate the emotion of fear and worry by morphia, which directly prevents shock."

Hewitt<sup>1</sup> considered that "for excitable, apprehensive patients the use of appropriate preliminary narcotics was almost essential to success."

Hughes Phillips<sup>2</sup> considers that the "preliminary injection of narcotics is, in most cases, invaluable and should be given in all cases where there is no idiosyncrasy, and he thinks it is worth while to give the patient

<sup>1</sup> "Proc. Roy. Soc. Med.," 1915, viii (Anæsth. Sect.), p. 19.

<sup>2</sup> Personal communication to author.

a trial dose a few days before the operation to make quite sure on this point. Morphine sulphate, gr.  $\frac{1}{6}$ , and atropine sulphate, gr.  $\frac{1}{180}$ , should be given three-quarters of an hour before the patient is brought into the theatre, and this not only allays the natural feeling of apprehension, but helps to prevent secretion and lessens the amount of general anæsthetic necessary. There is less tendency to cough or retch during the operation, and the annoyance caused by bleeding from this source is minimised. A further advantage is that if there are signs of shock, ether can be administered without giving rise to laryngeal spasm. If the patient is either specially nervous or of the alcoholic type, the addition of hyoscine hydrobromide, gr.  $\frac{1}{100}$ , is advantageous, or omnopon-scopolamine, 1 c.c., may be substituted for the morphine and atropine."

Bellamy Gardner<sup>1</sup> does not find that patients who require this operation are especially nervous beforehand, but looking forward to the relief of their symptoms. In view of this, he says narcotics are not called for as a preliminary routine from the psychological point of view, and as they reduce the vitality of the respiratory centre which may be required at its maximum activity at certain moments before the tracheotomy has been completed and cause somnolence and absence of coughing reflex during recovery, they are best avoided altogether.

Narcotics are undoubtedly valuable in plethoric, alcoholic, or muscular subjects, and it is said that one advantage in their use is that less anæsthetic is necessary, and, consequently, a lighter and safer degree of narcosis may be maintained throughout the operation. Chloroform lowers blood-pressure and conduces to shock. Atropine, administered before chloroform anæsthesia, checks excessive inhibition of the heart and controls and diminishes mucous secretions. Morphia, therefore, in the form of morphia sulphate, gr.  $\frac{1}{6}$ , in combination with atropine sulphate, gr.  $\frac{1}{180}$ , is frequently given as a hypodermic injection half an hour before general anæsthesia.

Levy<sup>2</sup> has recently expressed the opinion that "atropine may foster cardiac syncope under chloroform."

Since morphia and cocaine are antidotes to each other, the injection of morphia acts as a prophylactic in preventing the risk of cocaine poisoning, consequently cocaine may be used during the operation for controlling the laryngeal reflexes with far greater freedom and in larger quantities.

Some patients, however, are most susceptible to narcotics, therefore if they are used in any form, great care and discretion should be exercised in each individual case, especially when prescribing heroin, for it has been found that patients have been profoundly narcotised by  $\frac{1}{12}$  gr. It is a well-established rule that narcotics should not be given in patients suffering from any respiratory difficulties, therefore the importance of avoiding respiratory depressants cannot be disputed in cases of malignant disease of the larynx, in which the glottis is narrowed, owing to partial or complete fixation of the vocal cord.

#### REGIONAL METHOD OF INFILTRATION BY COCAINE OR ITS SUBSTITUTES.

The initial incision and dissection for both tracheotomy and laryngofissure may be rendered practically bloodless by the intradermic injection of the line of incision in the neck with cocaine or its substitutes twenty minutes before operation. As the result of careful preliminary prepara-

<sup>1</sup> Personal communication to author.

<sup>2</sup> "Proc. Roy. Soc. Med.," 1917, xi (Sect. Anæsth.), p. 12.

tion, many recent operations have been performed without even using artery forceps or tying a vessel.

The intradermic infiltration method of local anaesthesia with cocaine was first introduced by Reclus<sup>1</sup> in 1889, and he recommended that a weak solution of from 1 to 2 per cent. should be used, insensibility being obtained over an area of about half an inch from the punctures.

*Cocaine* solution, if used by itself, may be of 5 per cent. strength for hypodermic injection, and should be freshly prepared for each operation to avoid the formation of a fungus which may appear in a few hours,



FIG. 1.—Local infiltration anaesthesia of the middle line of the neck showing position where the hypodermic needle should be inserted through the skin.

when it becomes septic. Again, it becomes acid on standing, and loses greatly in anaesthetic value. One grain of cocaine is a safe dose for absorption in an adult (Chevalier Jackson).

*Novocain* is less toxic than cocaine, and may be used in a 2 per cent. solution with a few drops of adrenalin.

*Eudrenine*, a mixture of eucaine and adrenalin, is by far the best preparation. It is put up in ampoules of 0.5 c.c., containing  $\frac{1}{12}$  gr. of beta-eucaine hydrochloride (1 per cent.), with  $\frac{1}{40000}$  gr. of adrenalin chloride (1 in 30,000) in physiological sodium chloride solution preserved with

<sup>1</sup> P. Reclus et Isch. Wall, *Revue de Chirurgie*, 9th Année, 1889.



ehloretone. It is to be preferred to cocaine because its toxicity is less and the contents of three or four of these ampoules may be injected without any risk. In all infiltration work it is important to remember that to anæsthetise the skin the injection should be intradermic—*i. e.* between the layers of the skin—not hypodermic—*i. e.* beneath it—since the sensory nerve endings are situated just beneath the epithelium. The position of the needle is correct if its point can be seen from the surface. Pain of the initial prick of the needle may be done away with or reduced by applying to the skin a drop of pure carbolic acid on the point of a probe (Fig. 1). One or two deep injections may be given into the tissues, but this is not necessary since the subdermal tissues are not sensitive.

The author generally uses a long needle 3 in. in length, which is inserted through the skin at the suprasternal notch, the site of puncture having first been anæsthetised by a drop of pure carbolic. The needle is pushed upwards intradermically—along the middle line of the neck as far as the upper border of the thyroid cartilage, whilst the skin is drawn or threaded downwards on to the needle as it advances by the thumb and forefinger of the left hand. This causes little or no pain. The needle is gradually withdrawn whilst the solution is squeezed out of the syringe (Fig. 1). In some cases where the patient has difficulty in extending the neck through stridor, it may be advisable to use a shorter needle and divide the injection line into two parts, the needle being first inserted at the suprasternal notch and passed up as far as the thyroid isthmus, while it may again be re-inserted at the level of the hyoid bone to meet the upper limit of the first injection.

#### GENERAL ANÆSTHESIA AND ITS METHOD OF INDUCTION.

General anæsthesia is always indicated since it avoids pain and shock. Special experience and training is required.

Bellamy Gardner,<sup>1</sup> who has had a large experience in the anæsthetising of laryngeal cases, expresses his opinion as follows: "Chloroform is the only suitable anæsthetic for these cases. It may be quite well administered during induction upon a Skinner's mask until the tracheotomy has been effected, and then continued by means of a Junker's bottle with a long, flexible, leaden tube fitted to its distal efferent end, which should be small enough to rest within the orifice of the tracheotomy tube without obstructing the expiratory tidal airway. I think it necessary to point out very distinctly that an *orthopneic* patient—that is, one who is unable to lie down owing to dyspnoea—is in danger of complete obstruction under chloroform if laid down flat at any moment until the trachea has been opened. This should be obvious, but is frequently forgotten, as if the orthopnoea were a fancy on the part of the patient and not the dire necessity which it undoubtedly is. A small mouth-prop should be inserted between the teeth before the induction of anæsthesia, and a tongue-clip should be at hand in case laryngeal obstruction supervene. Gauze tampons around and above the tracheotomy tube form a more secure plug than the sponge packing of Hahn's tube. I think it far better to leave the tracheotomy tube *in situ* for twenty-four hours after the operation, as I have known one patient drowned by after-hæmorrhage in the night whose tube had been removed at once. There is no objection to inducing anæsthesia in the propped-up position; but great care must be observed in lowering these patients and especially in extending the neck backwards, which is apt to tighten the vocal cords and produce

<sup>1</sup> Personal communication to author.

complete respiratory obstruction. There should certainly be no undue delay in opening the trachea, though I have known it take the best part of an hour when all the latest ritual practices had been observed."

The warmed vapour of chloroform and oxygen is recommended by some anæsthetists, and is best administered by means of a special apparatus as used by Hughes Phillips<sup>1</sup> or by the very useful apparatus designed by Shipway.<sup>2</sup>

Chevalier Jackson advocates the use of intratracheal insufflation of ether on the grounds that it dispenses with a tracheotomy tube, allows a shorter incision—thereby saving time—and regulates better the anæsthetic, so that the cough reflex can be stimulated or controlled at the will of the anæsthetist during the operation.

The serious objections, however, to a short incision, the operative risk of performing laryngo-fissure without a preliminary tracheotomy, and the safer method of controlling and regulating the cough reflex by means of local injections and applications of cocaine will be dealt with later in this paper. Ether alone, or in combination, by irritating the mucous membrane, greatly increases the tracheal and bronchial secretions and should be avoided.

#### LOCAL INFILTRATION ANÆSTHESIA.

Laryngo-fissure can be performed under local anæsthesia, and it has been recommended, amongst others, by Bruns (Berlin), Kocher (Berne), and Edmund Meyer (Zurich). A number of cases have been reported in which the operation has been successfully carried out, but it is a severe ordeal, especially to sensitive patients, and a considerable strain to the operator. Cocaine cannot remove fear from a patient and the resulting shock to the nervous system.

StClair Thomson<sup>3</sup> has performed one operation under eudrenine infiltration anæsthesia and cocaine swabbing of the larynx. In exhibiting the case at the Royal Society of Medicine in 1903 he remarked that "the operation under local anæsthesia, *qua* the operation, was infinitely preferable to that under general anæsthetic, for it was easy to get the patient to cough, which was useful at certain times to prevent the blood and mucus from going the wrong way; but on the other hand, the mental and moral strain was much greater under local anæsthesia, both to surgeon and patient.

During recent years, however, improvements in operative posture, gauze tamponage of the trachea, and cocaine injections into the larynx and trachea have done away with these difficulties under general anæsthesia.

#### POSTURE OF THE PATIENT DURING OPERATION.

The most satisfactory position is one which not only prevents the entrance of blood into the trachea and bronchi, but also any mucus or other secretions from the pharynx entering the larynx (Fig. 18). It should, at the same time, be a position which causes least congestion of the vessels of the head and neck.

In the Trendelenburg position, which is used by some operators, the operating-table is tilted in such a way that the patient lies at an angle of 35 or 45 degrees with the pelvis and lower part of the abdomen raised,

<sup>1</sup> "Apparatus for administering Oxygen with Ether and Chloroform." "Proc. Roy. Soc. Med.," 1917, xi (Sect. Anæsth.), p. 13.

<sup>2</sup> "Administration of Warm Anæsthetic Vapours," *Lancet*, 1916, i, p. 70.

<sup>3</sup> "Proc. Laryngol. Soc. Lond.," 1903, ii, p. 68. "Proc. Roy. Soc. Med.," 1910, iii (Clinical Sect.), p. 120.

whilst the head and shoulders are lower than the level of the body to the extent that all fluids gravitate from the larynx and trachea. In the Rose or hanging-head position the patient's shoulders, after induction of anæsthesia, are drawn to the end of the table and elevated by a firm cushion, whilst the head is allowed to hang over the end of the table, firmly grasped on each side by an assistant's hands in order to steady and keep it in the middle line (Figs. 14 and 15). This position is commonly used for performing a low tracheotomy, especially in patients who have a short, fat neck. Chevalier Jackson uses the Trendelenburg-Rose position, which is a combination of these two positions. The advantage of these positions is that there is little danger of an aspiration pneumonia following the operation.

The objection, however, to these two positions is that the veins of the head and neck become distended with blood owing to gravitation, and considerable oozing of blood may consequently occur in the operation field, thus impeding the view of the parts. The difficulties of hæmorrhage occurring during removal of the growth has frequently been referred to by writers, though Butlin<sup>1</sup> says he had never seen bleeding which could cause the least anxiety. The position recommended is one in which the patient is placed on the back on the operating-table, whilst the shoulders are elevated by a firm cushion; this brings the head into full extension. A second cushion or sand-bag is then placed under the neck in order to raise it and cause the structures on its anterior aspect to become stretched and prominent (Fig. 18).

This is the ideal position and the one advised for thyro-fissure, since it is more comfortable for the operator to work in this position and less dangerous to the patient.

Chevalier Jackson has pointed out that while blood can be aspirated up the inclined closed trachea, it is impossible for it to be aspirated along an open trough—*e.g.* the opened larynx; so that with the head, neck, and shoulders in this position it is apparent that there is little risk of any blood entering the trachea and lungs (Fig. 21).

*(To be continued.)*

## SOCIETIES' PROCEEDINGS.

### ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

March 2, 1917.

*President:* Mr. T. MARK HOVELL.

*(Concluded from p. 153.)*

**A Series of Twenty-four Foreign Bodies removed from the Air and Food Passages, with Indications as to the Lessons to be derived from some of the Exhibitor's Experiences.**—Herbert Tilley.—The point accentuated in certain specimens in this series is the one raised by Dr. Irwin Moore—*viz.* that it is inadvisable to use blind instrumentation for the removal of foreign bodies from the air and food passages.

In one of the patients I was asked to remove a coin from the upper

<sup>1</sup> "The Operative Surgery of Malignant Diseases," 1900, p. 191.

part of the œsophagus in a hospital patient, but before I arrived there an enthusiastic house-surgeon tried to get the coin out with a coin-catcher. When I employed œsophagoscopy I could not find the coin in the gullet, and immediately afterwards a skiagram showed it was in the stomach; it had been pushed down by the ineffectual attempt to remove it with the coin-catcher. It was duly passed *per anum*.

Another case occurred in a soldier, in whom a portion of shrapnel casing lodged in the larynx, attention having been directed to it by hoarseness. I saw something black in the left ventricular band, and decided to try to remove it by the direct method under general anæsthesia. It slipped away from the forceps and disappeared. As the patient was struggling most of the time, I obtained permission to bring an expert anæsthetic the following week, and we found the foreign body in the left bronchus, where it had been located by the X rays in the interval. The lesson to be learnt is that for the removal of foreign bodies from the larynx the patient should be in the Trendelenburg posture, so that gravity does not aid the foreign body in gaining a deeper position. Also, one should have bronchoscopic instruments handy, in case the body slips from the larynx to a deeper region.

In another case, which was shown at the International Medical Congress in London, a pea had lodged in the right bronchus of an old man. Since it would have been futile to try to crush the pea and bring it out, we passed a bronchoscope on to it, and inserted a plug of wool soaked in paraffin, until it was close on the foreign body, and then by sudden withdrawal of the improvised piston the intruder was brought into the tube and readily extracted.

One of the three safety-pins was removed last Christmas Day morning. It had been swallowed forty-eight hours previously. The matron and the house-surgeon of a hospital considered the patient's story to be fanciful. As the symptoms persisted, a skiagram was taken and the pin located. I succeeded in removing it quite easily with a Mosher's œsophagoscope. The moral of this case is that the history given by a patient concerning a foreign body should not be pooh-poohed or neglected. It is always safer to have a skiagram taken.

The turkey bone was removed from the gullet of the wife of a medical man. Her husband tried on three occasions to push it further down with a probang. The result was some ulceration of the œsophagus. We removed it easily by the direct method (Mosher's distal lighted œsophagoscope).

This specimen is from my youngest case of a foreign body. The patient was a baby, aged four days. The nurse had given the child a "comforter" to suck, the inside of which was filled with cotton-wool. The child detached the comforter from the shield and swallowed it; the secretions of the gullet made the wool swell and the œsophagus was obstructed, so that nursing at the breast was impossible. We removed the foreign body by means of a small bronchoscope.

In another instance a message came to my house from University College Hospital that a child had swallowed a foreign body. I told them to put the patient under an anæsthetic, and I would be round in ten minutes. I removed the foreign body and was back at my house within thirty minutes of leaving it.

The last specimen was from a fatal case. A man was sent into the hospital forty-eight hours after having swallowed a denture during sleep. Before admission, ineffectual attempts had been made by means



of a probang to push it into the stomach. The lower pharyngeal regions were obstructed by œdematous swellings, the breath was foul, and the whole area was bathed in purulent secretion. We found our way into the œsophagus, and saw the denture lying in a greyish-green surrounding. We took hold of it with forceps and removed it without difficulty, but the patient died forty-eight hours afterwards. *Post-mortem*, three perforations were found in the side of the œsophagus close to the foreign body.

I show these foreign bodies and skiagrams in order to help in establishing the rule that at the present moment when endoscopes are so numerous, and there are so many experts to use them, it is unjustifiable to attempt the removal of foreign bodies in the air or food passages by blind instrumentation.

**Pin in Bronchiole of Posterior Lobe of Right Lung.—Hunter Todd.**—Girl, aged twelve, admitted to the London Hospital on November 29, 1916. The mother stated that on the previous evening she fell off a chair whilst holding a long pin between her teeth. The girl complained of no symptoms, but as her mother could not find the pin she brought the child to the hospital to be X-rayed.

The pin appeared to be low down in the right bronchus with the head lying downwards. On the day of admission I passed a bronchoscope (medium size) along the right bronchus until it could be pushed down no further; the distance measuring  $13\frac{1}{2}$  in. from the teeth. A good view of the openings into the bronchioles could be obtained, but the pin could not be seen.

Two days later another attempt was made under the guidance of an X-ray screen. A photograph was taken when the bronchoscope had been inserted at a distance of 10 in. from the teeth. It shows it to be in the right position, although some way from the pin.

A third attempt was made a week later (December 8) also under the guidance of an X-ray screen. When the patient was lying on her back it seemed as if the bronchoscope had almost reached the pin, and that a pair of forceps passed along it would pass over the pin; but on turning the patient on her side it was found that the bronchoscope and forceps were well in front of the pin. It seems, therefore, that the pin is situated in the lower posterior bronchiole.

The patient suffered no inconvenience as a result of these examinations. She was kept in the hospital until January 12, over five weeks after the last examination.

An X-ray photograph, taken two days ago, showed the present position of the pin, which does not seem to have moved. The patient is still in the best of health and has no cough nor expectoration.

The points on which I would like the opinion of members of the Section are the following:

(1) Should a further attempt be made to extract the pin through the bronchoscope or should it be left *in situ*?

(2) Is there more danger in leaving it *in situ* and risking an abscess of the lung than in making further attempts at extraction?

(3) Is this a case for surgical interference and for direct removal of the pin from the lung by an intrathoracic operation?

My own opinion is that nothing further should be done, because as the patient is still in the best of health it is probable that the pin has become encysted and may give rise to no further trouble.

The surgical view that foreign bodies in the lung always lead to an abscess is not necessarily correct, because if a patient keeps well in spite of having inhaled a foreign body, unless the fact is known and the case is X-rayed, as in this particular case, such a condition may never be suspected.

Dr. IRWIN MOORE: Mr. Hunter Todd's case relates to one of the few foreign bodies in the lungs which are out of reach of the bronchoscope. I understand that this pin has not yet been located by the bronchoscope, though it has been demonstrated by the X rays. It is evidently situated in a posterior branch of an inferior lobe bronchus, and the only endoscopic tube we have that can be used in a child of this age measures 13 in., and this would not pass along the smaller bronchi nor reach the pin. Mr. Somerville Hastings had a similar case at the Middlesex Hospital in 1912, where a child, aged four-and-a-half, aspirated a 2 in. shawl-pin into the lung. Many attempts at removal with the bronchoscope, even through a low tracheotomy opening, failed. A month later Mr. Kellock<sup>1</sup> performed pneumonotomy and successfully removed the pin. It was situated  $\frac{3}{4}$  in. above the diaphragmatic surface of the lung. There was no associated empyema, and the child made a complete recovery. Chevalier Jackson, in his latest book on "Per-oral Endoscopy," refers to a few exceptional cases of failure which he has had, as beyond the limitations of bronchoscopy, and they were foreign bodies in a lower lobe bronchus, and out of reach. He considers that in such cases, if the foreign body is not extracted, an abscess always forms, sooner or later, and he records a case in which a pearl collar-button remained in the left bronchus for twenty-six years before abscess formation occurred.

Mr. NORMAN PATTERSON: I think the pin in Mr. Todd's case might be got at by doing a tracheotomy, and carrying out inferior bronchoscopy.

Dr. D. R. PATERSON (Cardiff): I agree with Mr. Norman Patterson as to the advantage of tracheotomy in these cases, because it enables one to get nearer the foreign body, and a larger tube can be used. For a really good search in the lower parts of the bronchus, tracheotomy gives great advantages. I have adopted it twice in cases of very small children. In one case I found removal to be impossible through the larynx, but after doing tracheotomy it was manipulated without the slightest difficulty.

The PRESIDENT: Has strapping the child to a board, and more or less inverting it, been tried? It could not do any harm.

Sir STCLAIR THOMSON: These are most interesting cases, and there are many lessons to be drawn from them. One would like to study the histories in detail. One lesson is the use of suction, which would be very useful in cases of bodies impacted in a secondary bronchus. The air behind it is absorbed, and in getting it out there is the negative pressure on the opposite side. A foreign body seems to slip out of our forceps, and in some cases we think it catches at the end of the bronchoscope or œsophagoscope: yet we know that if we go at it again and remove the whole *en masse*, we are much more successful. So now, when I feel I have seized the foreign body, I remove the whole thing *en bloc*, and in doing so, I think the suction made by withdrawing the tube helps us very much. I had a case in which I saw a pin projecting from a

<sup>1</sup> Thomas H. Kellock, "A Case of Pneumonotomy for Foreign Body," *Proc. Roy. Soc. Med.*, 1912. vi (Clin. Sect.), p. 64.

secondary bronchus. I got hold of it; there was a gush of mucus, and I lost sight of it. I let go, and withdrew the tube, which was full of mucus. I wiped it, and went in again, but there was no pin to be found! I took out the tube to have a rest, and when I turned up the lights the pin was seen on the floor. It had come out with the first gush of mucus. We know that to break up peas in the lung is a deadly proceeding. With regard to Mr. Todd's case, has anyone used the electro-magnet for such a case? I have seen surgeons use it, and they said their object was to get the pin simply to shift its position. This might help to get the pin from the secondary bronchus to the primary bronchus.

Dr. W. HILL: Iglauer has used the electro-magnet, and found it useful for metallic foreign bodies which were non-impacted, but when they were impacted it did not shift them. So in America it fell into disrepute on account of failure in just those cases where it was required. With regard to the method of suction, I have shown a piece of chestnut, a portion of which was just projecting from a secondary bronchus. I could touch it with a sharp hook, but it would not come out. The patient was aged 13 months. I deliberately applied suction. I passed a glass tube down through the bronchoscope and connected the tube with a suction bottle. I got the piece out by this means, but on looking again into the bronchoscope I saw a second piece, which had dropped off the tube. At that moment the child gave an inspiration, and the second piece of chestnut disappeared from the endoscope, and went down the right bronchus. On following it up without cocaineisation, there was a spasm and cough, and the piece was ejected against my spectacles. With regard to Mr. Todd's case, I suppose most of us will advise him to leave it alone, but I do not know whether it is good advice. If the patient gets bronchiectasis, it should be more easy to find.

Mr. TILLEY (in reply): In answer to Dr. Paterson, I removed the safety-pins through Mosher's tube, with a distal light. In all endoscopic work I prefer distal illumination to the proximal light afforded by Brünig's instrument.

Mr. H. J. BANKS DAVIS: Three or four years ago it occurred to me that using such an instrument as a magnet might enable one to remove these pins and needles. Several attempts to magnetise the fine gripping forceps were made for me by an electrical engineer, but, owing to the length of the instrument, it was found not possible to magnetise the tip—which after all is the most important part—but I do not see why this difficulty should not be overcome.

Dr. KELSON: With regard to blind instrumentation, an interesting case had just left the hospital. It was that of a man who, just before Christmas, had been eating nuts, when a piece of one stuck in his throat. He stated that on the following day, vigorous and painful instrumentation was used with a probang. On the next day he had a swelling in the neck, and eight days later he came to hospital with a big brawny swelling on the left side, and the left arytaenoid and left ventricular band were much swollen. Nothing could be seen of the foreign body, though he was watched for a few days, and X-ray search made. I made an exploratory incision into his neck, and let out a lot of fœtid pus, and bare cartilage could be felt. The wound continued to discharge for some time, but after opening one or two other abscesses, it has now cleared up.

**Ethmoiditis causing Blindness.—G. W. Dawson.**—Patient, a woman, aged twenty-seven, was sent to me by Mr. Kenneth Campbell on February 9, 1916. He reported optic neuritis of right eye, left eye slightly affected. For six weeks she complained of pain at the back of the eyes and across the bridge of nose; a small quantity of pus was seen in each olfactory cleft.

February 26: Eye report.—Right disc indistinct and pale; left, marked papillitis; elevation,  $1\frac{1}{2}$  D. She was almost totally blind and could only distinguish light and darkness.

February 26: Submucous resection of septum, which was thickened and deviated high up. Both ethmoids curetted and found to be necrosed.

In two days her vision was much improved, and on March 6 the ophthalmic surgeon reported a trace of neuritis. On March 31 Mr. Kenneth Campbell reported vision in each eye  $\frac{6}{6}$ .

**Report of Two Cases of Mutton Bones impacted in the Œsophagus; Œsophagoscopy; Recovery.—Irwin Moore.**—CASE 1: *The Spinous Process of a Cervical Vertebra.*—In May, 1916, patient, aged sixty-two, came to the London Throat Hospital complaining that he had swallowed a piece of mutton bone four days previously. He was unable to swallow any hard food and even soft food caused vomiting. A radiogram, taken by Dr. Finzi, after a bismuth feed, outlined the foreign body about an inch above the level of the sternal notch. Under a general anæsthetic the following day an œsophagoscopic tube of 10 mm. diameter was passed, and the piece of bone was easily located lying across the œsophageal lumen. On passing forceps and attempting to seize the bone by its extremity in order to turn it into its narrower diameter, it was displaced and slipped 2 in. lower. While again applying the forceps through a 12 mm. tube, a paroxysm of retching occurred, due to light anæsthesia, and the bone was vomited up the œsophagoscope on to the patient's face. It measured 24 mm. (1 in.) in length, and 8 mm. ( $\frac{5}{16}$  in.) in diameter.

CASE 2: *The Transverse Process of a Cervical Vertebra with Bolus of Meat attached.*—Patient, a housemaid, aged forty, swallowed a piece of mutton bone on December 5, 1916, which stuck in her gullet. She was sent to a general hospital, where she was told there was nothing wrong; four days afterwards she returned, and a brush-probang was passed down the œsophagus; then she was again told that nothing was there and sent home. Because she was unable to swallow anything but liquid food, most of which was regurgitated, and because her breath had become very foul, she was advised to go to the London Throat Hospital. When first seen on December 8 her breath was extremely fœtid, this suggesting that sloughing had taken place. Her temperature was subnormal (96° F.). A radiogram was at once taken, and it showed a piece of bone impacted in the œsophagus at the level of the cricoid cartilage. The œsophagoscope was passed under general anæsthesia with great difficulty, owing to the patient having a short thick neck, contracted mouth, prominent teeth, and a very stiff jaw. The bone was seen and seized with forceps, but on account of its firm impaction with the surrounding œdema, ulceration, and bleeding—which kept the field obscured—the risk of doing further damage was considered, and attempts at removal postponed. Considerable difficulty also arose during the examination from cessation of breathing four times, and



artificial respiration was found necessary. The condition of the œsophageal wall was probably due to the previous ill-advised attempts to use a bougie. On re-examination, two days later, a large piece of decomposed meat was discovered and removed by forceps. Further search was postponed on account of the patient's condition, which required artificial respiration on three occasions. At midnight the patient vomited up the bone during a coughing attack. It measured 25 mm. (1 in.) transversely, and 16 mm. ( $\frac{3}{4}$  in.) in length, and consisted of the transverse process and portion of the body of a vertebra, with three sharp and jagged angles. Patient made a speedy recovery, and left hospital a week later.

*Remarks.*—In connection with the first case it is interesting to note that this is not the first instance of foreign bodies in the œsophagus or bronchi being expelled by vomiting or coughing while the œsophagoscope or bronchoscope were in position and covering the object. It may be useful in some cases to get rid of foreign bodies in this way by stimulating the laryngeal or pharyngeal reflexes during light anæsthesia. The second case was somewhat similar to one reported by Dr. D. R. Paterson, at a meeting of the Laryngological Section on December 3, 1915,<sup>1</sup> the measurements of the piece of bone being practically the same. In that case the patient unfortunately died from septic absorption, six days later, as the result of a lacerated œsophageal wall, probably caused by the previous attempts of a surgeon to pass a bougie. These cases exemplify the serious risks to the patient's life from an impacted bone, and the danger which may follow the use of a bougie; also the importance of an examination by X rays of all cases in which a foreign body is said to have been swallowed. The great advantages of œsophagoscopy cannot be too frequently emphasised.

### **Infiltration and Ulceration of Vocal Cords; Malignant?—**

**W. H. Jewell.**—E. H. W.—, male, aged fifty-three, became hoarse eighteen months ago, and has continued so. He has been a heavy smoker and drinker for thirty years. He has never had any pain, expectoration, difficulty in swallowing, or hæmorrhage. His septum is deflected. Wassermann reaction negative. The anterior extremities of the cords adjoining the anterior commissure have a yellowish glazed appearance, and behind this the left cord is swollen and abraded for the greater part of its extent. The margins of the cords do not meet posteriorly on phonation.

**Dr. Jobson Horn:** The disease, I think, is malignant. It may be more extensive than the mirror would show. The case should be closely watched, and the position of affairs stated to the man, so that he may decide whether he will have the part involved removed as a precautionary measure, or leave it alone. The patient, I understand, has been taking iodide of potassium with some slight benefit.

**Mr. Clayton Fox:** I think it is hypertrophic laryngitis. There is a similar thickening of the opposite cord, more anteriorly, and the man has suffered from marked nasal obstruction, and is working in dusty surroundings. The cord in question is quite mobile, and if it were what it is said to be, with that infiltration, there would, surely, have been some sluggishness in the cord by this time. I have seen a similar case recently which was diagnosed as laryngitis tuberosa. There was fibroid thickening, but the cord has now cleared up entirely under treatment.

<sup>1</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL., xxxi. pp. 149-150.

Mr. FRANK ROSE: I think there is severe laryngitis in this case, but the localised lesion on the left cord is, to my mind, highly suggestive of malignant disease. I should watch the lesion very closely, and if there is evidence of increase in size, I would recommend that the cord be removed.

The PRESIDENT: The case is very suspicious.

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## Abstracts.

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### PHARYNX.

**Hemiplegia after Tonsillectomy.**—William A. Scrutan. "The Laryngoscope," February, 1917, p. 96.

Scrutan records a case of a girl, aged eleven, on whom tonsillectomy was performed under general anæsthesia on July 10, 1915. A small portion of the tonsil was left at the lower end of the left fossa, but was removed later by means of the forceps and snare. Hemiplegia on the left side was noted on the following morning, and the patient was reasonably certain that the paralysis existed when she recovered from the anæsthetic. The temperature rose to 101.8° F. during the forty-eight hours following the operation, and the return to normal extended over a number of days. Recovery from the paralysis began within seventy-two hours in the leg, and shortly afterwards in the arm. In two weeks the child began to walk about the ward, and a month later left the hospital without assistance. Scrutan thinks that the hemiplegia was probably due to embolism. The operation was performed under his direction by a man seeking instruction, and lasted twenty-five minutes. The piece of gland left by the tonsillitome had to be fished for repeatedly so that there was considerable traumatism and an unusual amount of vigorous sponging in the fossa which may have caused dislodgment of a clot into the circulation. Six months after operation the leg seemed to have entirely recovered, but a condition of athetosis existed in the foot. The arm also recovered control of all movements, but the execution was slow and athetosis was observed in the hand. The face still showed paralysis at the angle of the mouth.

*J. S. Fraser.*

**Treatment of Adhesions of the Soft Palate by a Silver Plate Method.**—Hazlehurst. "Laryngoscope," July, 1917, p. 574.

Hazlehurst states that tertiary syphilis is the most common cause of adhesions of the soft palate to the posterior wall of the pharynx. The condition is relatively frequent in the hereditary form of the disease. Rhinoscleroma, diphtheria, lupus, and pemphigus are rare causes of the condition. Traumatic adhesion may follow operation for adenoids. Complete adhesion is rare. The nasopharynx may be more or less filled with fibrous bands, which at operation are broken down or cut through with difficulty. The symptoms are largely those of nasal obstruction, and vary according to the extent of the lesion. Treatment is mainly directed, after loosening or cutting through the adhesions, towards preventing re-adhesion. Hazlehurst's technique is as follows: Ether anæsthesia through the peroral intubation tube; division of the adhesions, keeping as close to the posterior wall of the pharynx as possible; separation of adhesions in nasopharynx by means of instruments or the finger. A

thin silver plate is trimmed with scissors to the required size, approximately 3 cm. square, the sharp corners rounded slightly. Into one of several small holes in the plate a silver wire is attached, and the loose end of the wire then fastened to a rubber catheter passed through the nose into the mouth. Traction was then made on the catheter, and, with the aid of a little manipulation from the pharyngeal side, the plate drawn snugly into the nasopharynx. The wire, holding the plate in position, is fastened to the cheek by adhesive plaster.

The plate was borne by the patient without removal for eighteen days with practically no discomfort. When removed the patient could breathe freely through the nasal passages. This patency still persisted three years later. The patient has, however, a nasal twang in his voice.

*J. S. Fraser.*

## NOSE.

**Asthma associated with Ethmoidal Disease.**—J. Mackenzie Brown. "Annals of Otology," etc., xxvi, p. 399.

Reports observations on 27 asthmatic cases in which exenteration of the diseased ethmoid labyrinth was done. The ages of the patients ranged from four to sixty-two years. In 13 cases there was marked deviation of the septum. The antrum was involved in 3, the frontal sinus in 2, and the sphenoid in 2. The ethmoids were involved in every case, 22 being hypertrophic and 5 suppurative. Exenteration relieved 6 completely, decidedly improved 12, slightly improved 7, and 2 were unrelieved. Of the last 9, 6 had marked bronchial pathological lesions.

*MacLeod Yearsley.*

**Septal Hæmorrhage: Its Cure by Submucous Elevation.**—J. Leshure. "Annals of Otology," etc., xxvi, p. 420.

The author finds that the object attained by incision and elevation of the mucoperichondrium is free surgical access to the bleeding area, and the rational treatment of a bleeding vessel is compression. This can be done *en masse* with a flat-bladed forceps. It is most satisfactory in septal hæmorrhage in children. The mucoperichondrium is incised and elevated backward for 1 in. and down to the floor of the nose, and the elevated membrane compressed with forceps. The flap is replaced and packed.

*MacLeod Yearsley.*

**Nasal Refracture.**—L. L. Stanley. "The Laryngoscope," January, 1917, p. 49.

L. L. Stanley remarks that in almost any fistic encounter the nose is the most accessible point of attack. As a result it may be more or less injured. In some cases the blow is not sufficient to fracture the nasal process of the superior maxilla or the nasal bones, but there is force enough to dislocate the cartilage of the septum along with the mesethmoid and vomer, so that permanent nasal obstruction results. In other cases the bones are broken and the nose is deformed. If this condition is recognised soon after the accident and the fracture reduced, there may be no permanent deformity. Without attention, however, the result is disfigurement.

Stanley advises operation under ether anaesthesia. As soon as the

patient is relaxed, the operator places against the convex side of the nose a round piece of wood, or buffer, 6 in. long and 1 in. in diameter. The end placed against the nose is heavily padded; then with several strokes to a mallet against this buffer, each stroke being progressively heavier, the nose is refractured and is quickly set in proper position. There is usually some ecchymosis following very soon, but by holding the nose firmly with the thumb and finger undue swelling is prevented.

As soon as the nose is in proper position, the nasal cavity is quickly packed with strips of gauze previously boiled in petrolatum. This is packed in rather tightly, and soon the bleeding from the nose is stopped.

When the intranasal packing is in place, pieces of gauze, cut to fit over the nose, cheeks, and forehead, are saturated with liquid collodion and are then placed over the nose in layers, each one being allowed to harden by means of a current of air which evaporates the ether before the next layer is applied. In a short time the splint is dry and the nose is held in normal position. On the second day the intranasal packing is removed, and on the fifth day the collodion gauze splint is taken off. The nose is usually found to be straight and to functionate better than before, though Stanley remarks that it may be necessary to do a subsequent submucous resection of the septum. After operation there is usually a "black eye," which persists for several days.

*J. S. Fraser.*

#### **The Use of the Turbinals and the Septum in the Repair of Injuries and Defects of the Wall of the Nasal Cavity.—G. Seccombe Hett.**

"Lancet," December 15, 1917, p. 892.

The author has found the middle and inferior turbinals very useful for the repair of damage to the nose due to war injuries. His conclusions are as follows: (1) Turbinals and septum are capable of being advanced into new positions to form fresh attachments and continue to live. (2) Advancement of the turbinals is a useful procedure in cases of loss of the whole or part of the nose. (3) The upper septal swing is useful as an aid for supporting the new bridge of the nose. (4) The lower septal swing is often required in the pug-nose type. (5) The septal cartilage after removal by submucous resection may be used as a free autogenous graft for increasing the prominence of the sunken bridge or for a nasal support. Heterogeneous septal cartilage graft may be used in the same way.

*Macleod Yearsley.*

#### **Nævus treated by X-rays.—E. P. Cumberbatch** "Proceedings of the Royal Society of Medicine" (Section of Electro-therapeutics), January, 1918, p. 13.

The case is that of a girl, aged nineteen. At the age of five a nævus formed on her nose. Slight bleeding was occasionally noticed from the nose, but it was not profuse till she was aged fourteen. On examination, at this time, it was found that the nævus occupied the anterior cartilaginous part of the nose and vestibule, spreading to the cheek and upper lip on the right side. The nævus pulsated strongly.

The facial artery was tied, but severe hæmorrhage recurred later. The external carotid was then tied, but with no more success.

X-ray treatment was commenced in November, 1910. Hæmorrhage persisted at intervals until March, 1912, when the bleeding became less frequent and less severe. The X-ray treatment was left off in the summer of 1912.



Towards the end of the same year the bleeding began to be more frequent and severe, and a second course of X-ray treatment was commenced. It had the same beneficial effect. It was discontinued in the summer of 1913. In 1914 there was a severe attack of bleeding, and the patient appeared to be quite blanched. It was found that it took place from an artery in the septum. The vessel was obliterated by means of diathermy. Since then there has been no hæmorrhage.

*Archer Ryland.*

## EAR.

### Is a Modified Radical, or Heath, Operation a Justifiable Procedure?

—A. S. Kaufman. "Annals of Otology," xxvi, p. 543.

An attempt to reduce the Heath operation from a universal panacea for all oto-suppurative ills to its proper level.

The author concludes that it is a justifiable operation in (1) chronic mastoiditis when there is only partial destruction of the tympanic membrane and the ossicles are in position. (2) In cases of acute mastoiditis with an unusual amount of destruction of the tympanic membrane and loss of hearing. (3) In cases of acute mastoiditis with extensive necrosis of the bony portion of the external auditory canal. It should never be attempted where there are cholesteatomatous masses found in the antrum, which indicate the radical operation; and it should never be done until all non surgical methods, including vaccines, have been tried.

*Macleod Yearsley.*

### Vertigo: Its Causes and Methods of Diagnosis.—Lewis Fisher.

"Annals of Otology," xxvi, p. 511.

The author emphasises the following points:

(1) There can be no vertigo unless there is a disturbance of the vestibular apparatus. When diseases of remote organs are accompanied by vertigo, it is because those states affect the vestibular apparatus.

(2) Vertigo may be due to some simple irritation of the vestibular tracts. In such a case they are temporary and fleeting in character, leaving the apparatus itself intact, and the tests will therefore show normal responses.

(3) There may be a lesion of the internal ear itself.

(4) There may be a lesion situated within the brain along some pathway in association with the ear.

Disturbance of the vestibular apparatus with vertigo can be definitely analysed and diagnosed only by means of the ear tests.

*Macleod Yearsley.*

### Experimental and Histological Researches on Labyrinthine "Commotion."—Prenant and A. Castex. "Rev. de Laryng., d'Otol., et de Rhinol.," September 15, 1917.

Rabbits and guinea-pigs were made deaf by explosions. In checking the clinical results, hearing was tested by whistles and the barking of dogs; vestibular function by Bárány's tests and galvanism. At autopsy the middle ear and brain were examined, and sections of the internal ear cut in paraffin wax. Thus the authors' investigations were very thorough, and their findings may be epitomised as follows: (1) Dislocation of supporting-cells and hair-cells of Corti's organ, chiefly in the

basal coils of the cochlea. (2) Hemorrhage into the scala tympani. (3) Shrivelling of the cells of the ganglion spirale. (4) Ascending degeneration of the cochlear nerve. (5) None of the above effects are produced if the cochlea be previously subjected to trauma. Finally, there is usually no macroscopic lesion produced in the middle ear or in the brain. Moreover, the cochlea appears to bear the brunt, leaving the vestibule unaffected.

*H. Lawson Whale.*

### MISCELLANEOUS.

**The Nature and Symptoms of Cardiac Infection in Childhood.**—F. J. Poynton. "Brit. Med. Journ.," March 2, 1918.

It is nearly twenty years since the writer and Dr. Paine isolated from the tonsils of a patient suffering from acute rheumatism and tonsillitis a strepto-diplococcus identical with that which they had already found in the blood, heart-valves, and joints of cases of rheumatism. The fact that rheumatic infection may enter the body by way of the tonsils was thus established.

There are, of course, other avenues of infection, and this must be borne in mind when considering the question of tonsillectomy in the treatment of rheumatism.

The important practical lesson is that "acute tonsillitis in a child should always call for a careful examination of the heart." There is no condition of the tonsils which may be described as "rheumatic." It is probable that the specific micrococci are present in the healthy tonsil, and only acquire their pathogenic qualities when the resistance is lowered. The organisms may also be present in adenoid vegetations, and the nasal mucosa itself may well be a portal of infection. Poynton is convinced that certain cases of acute otitis are of "rheumatic" origin. Enlarged cervical glands are common in rheumatic children and afford proof of the entrance of the infection into the system

*Douglas Guthrie.*

**The Complement-fixation Test in the Diagnosis of Tuberculosis with a Study of 135 Cases.**—G. W. McCaskey (Fort Wayne, Indiana). "Amer. Journ. Med. Sci.," November, 1917.

The early diagnosis of active tuberculosis is one of the most difficult and most important problems of clinical medicine. The subcutaneous tuberculin test, while absolutely prohibited by universal consent in a large group of cases, has in it an element of possible danger difficult to estimate because of the possible or even probable remoteness of effect.

Specific complement-binding bodies are present in the blood of patients suffering from tuberculosis. They are not constantly present even in clinically active cases, and may be present in cases which have no clinical manifestations. A positive result, however, proves the existence of a tubercular focus, which is, at least, pathologically active. Its clinical importance and its relationship to any co-existing syndrome can only be decided by correlating it with all available clinical data, precisely as in the case of a positive Wassermann reaction in an obscure case. A negative fixation test does not absolutely exclude clinically active tuberculosis any more than a single negative Wassermann reaction excludes clinically active syphilis.

With due regard to its obvious limitations, the tuberculosis complement-fixation test is a valuable addition to our diagnostic methods.

*Thomas Guthrie.*

## OBITUARY.

DR. H. MACNAUGHTON JONES.

WITH the death of Dr. H. MacNaughton Jones a striking and distinguished figure disappears from the medical stage. To the readers of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY he was best known in connection with the British Laryngological, Rhinological, and Otological Association. Four years after he graduated he founded the Cork Eye, Ear, and Throat Hospital, and four years later the Cork Maternity. For ten years he was Demonstrator and Lecturer of Descriptive Anatomy, and subsequently University Professor of Midwifery in Queen's College, Cork, as well as Examiner in Midwifery (Obstetrics and Gynæcology) in the Royal University of Ireland for seven years. His energy was extraordinary, and he was eminently many-sided in his activities. He jocularly claimed that he was a general specialist, and there was certainly very considerable foundation for the claim. His utterances in our special association were always well considered and illustrated from his vast experience. He was certainly greatly blessed beyond many other speakers by the possession of a most mellow and round-toned voice, which, with his handsome physical personality, gave him what others were inclined to think almost an unfair advantage. As a new-comer to London he had, like others, to run the gauntlet of the usual difficulties presented to an outsider, but it is on record that no one ever made a more favourable impression than he did among the officers and members of the British Gynæcological Society when they came to understand his character as expressed in his modes of thought and action. The writer of this notice remembers his first association with Dr. MacNaughton Jones when, in the early eighties, they together attended upon the wife of a general practitioner in the East End of London, and the patience, dexterity, and sympathetic manner of the older man made a lasting impression upon the younger one, who accepted it as the model of what the manner of the good physician ought to be. It is reported by an anaesthetist who once had to administer for one of his operations that the doctor in charge was half an hour late, that a steriliser full of instruments was knocked over, and everything occurred which could ruffle the temper, but Dr. MacNaughton Jones was utterly undisturbed, and preserved an equanimity characteristic of a refined gentleman and a model doctor.

His work on the diseases of the ear and nasopharynx had a character of its own in which it differed from many of the more stereotyped works, and in its later editions he had the collaboration of several colleagues, so that the work became a very complete one. He brought out an atlas with many representations of the tympanic membrane in disease, which in its day was very helpful to students of the subject.

He was seventy-three at the time of his death, and until his late illness retained a most exceptional amount of the freshness and activity of youth.

DR. M. PROSSER JAMES.

The name of Dr. Prosser James has of late years been chiefly familiar to those who passed through Deanery Street, as, owing to his age and infirmity, he had for long retired from active practice. He was a physician of a wide range of interest, and at the London Hospital was for a time Lecturer on Forensic Medicine and then on Materia Medica and Therapeutics. He was one of the pioneers in the use of the laryngoscope and rhinoscope, and assisted in the development of Golden Square Throat and Ear Hospital as a training school for specialists.

## NOTES AND QUERIES.

## THE EDUCATION OF THE OTO-LARYNGOLOGIST.

SIR,—The letter by "Pelion" in the May issue of your Journal has induced me to set down certain opinions which I have held for a long time.

All will admit that consultants should form the *élite* of the medical profession. They should have the best brains, the highest skill, and the greatest energy; they should be an aristocracy of merit, and they are—a plutocracy. Hitherto it has been almost essential for a man, who wishes to become a specialist, that he should have money of his own or influence behind him, or, better still, both.

It is now generally agreed that any boy in a Primary School should be able, if he shows that he is worth it, to gain free admission to a Secondary School, and, further, that any boy in a Secondary School, who has the necessary brains and application, should get a really free University education. I maintain that any graduate who is fitted for a specialty and wishes to take it up should be able to do so without calling on his parents to push him by their money and influence.

We must try to insure that the graduates who take up oto-laryngology are those who really care for the subject. My experience is that, among every hundred students, two or three appear to be specially interested in otology and laryngology. These men spend their spare time during the session—and sometimes the morning hours of the vacation—at the Ear and Throat Department in preference to going to the Medical or General Surgical Hospital. The proportion indicated is just about the correct one between ear and throat specialists and the other members of the medical profession. It would thus appear as if the choice of an oto-laryngological career might be left to a sort of "natural selection."

In this country all that we have up to now expected of a specialist or consultant is that he should be more or less of a gentleman and reasonably competent at his work. He need not do anything outside the routine work of the department to which he is attached—indeed, in the past he was often advised by his seniors not to push himself unduly, but merely to be useful and obliging. He was told to record an occasional case just to show that he was alive, and given to understand that he would in good time slip quietly into the position his senior would give up. I have heard a senior say: "It's all very well for a man to do original work when he is young, but the day comes when he is so busy with private practice that he has no longer any time for it." The senior appeared to look on this time as one of happy release, when a man could (mentally) sit back and rake in the guineas. It did not seem to occur to him that the junior might not altogether welcome such a golden age, and might regret that his time for research work was now very limited.

Is it any wonder that the young specialist comes to the conclusion that he had better take the advice of his senior? He knows that in ten or fifteen years the senior will have to leave the hospital, and that he himself will step into the senior's shoes. Meanwhile he has enough to have a pretty good time. He can join a club, play golf and bridge, and cultivate "consultant's tact," i.e. he can become an adept in the gentle art of cajoling the general practitioner. Of course, there are exceptions to this rule. There are men who have got on in spite of poverty and lack of influence, but not many. One—or even two—swallows do not make an oto-laryngological summer.

We have to face the argument that the stimulus of money-making is necessary to insure progress. Well, we have had this stimulus in the past, but—has it resulted in much progress? "Private enterprise" is wearing rather thin. Is it not about time that we should give a trial to "public service"?

"Pelion" suggests that the examination for the F.R.C.S. (England) is too exacting as regards general surgery, and that it does not recognise the specialties. A good standard of general surgical knowledge is certainly necessary for a specialist, but there is a danger that, after two years of concentrated work, a man's brains may be rather played out, his originality crushed, and his energy too much dissipated for any real research work in the specialty to which he is going to devote his attention. The man may be forgiven for thinking that he needs a rest after his heavy expenditure of time, money, and brain power.

Again, is it advisable that a specialist who has got on to the staff of St. Francis Hospital, London, or that of the Royal Infirmary of Glasburgh, should remain forever attached to his particular institution? Would it not be better that he should be able to climb from a junior appointment in a small town to a similar appoint-



ment in a larger one, and from this to the senior position in a small hospital, until finally he reaches the position of senior specialist surgeon in a big medical and surgical centre?

What constitutes an ideal training for a graduate who desires to become an oto-laryngologist? Leaving aside for the present the question of much-needed reform in school education and in the undergraduate curriculum, I would suggest that, after getting his degree, the future oto-laryngologist should hold the position of house-physician and then of house-surgeon for six months each. After that he should spend a year in general practice. Returning to hospital, six months should be employed in the study of nervous diseases, so that the future specialist may become familiar with the technique of neurological examination and diagnosis, which is of great importance in many otological and laryngological cases. After that he should do special work in anatomy, physiology, pathology, and surgery, and prepare himself for his Fellowship. He should also act as assistant to a general surgeon who performs many operations on the head and neck, so as to become familiar with the surgery of these regions. (Later on, no doubt, this would merely mean that he worked with an oto-laryngologist.) After he has taken his Fellowship he should commence work at the oto-laryngological department of a General Hospital or at a Special Hospital and work there for a year, after which he should study abroad for a similar period. A good working knowledge of French, German, or Italian should be compulsory. It would be better still if the specialist knew all three.

Under present conditions only the son of a wealthy parent could possibly obtain such a training, and yet I am sure that all specialists will agree that none of the suggested training is useless, and that most of it is desirable. Several of the items might be run concurrently. One can not help hoping that, in the future, Governments, Universities, Municipalities, and County Authorities may be able to take long views and see that it would be really worth while to train a man who is fit to be trained.

It is true that during recent years the Education Authorities have done something in the way of recognising the importance of surgical specialties such as ophthalmology and odontology, and have thus made openings which might\* and should, be filled by young specialists. (At present these positions are mainly held by those who already have other—and senior—appointments.) As far as I am aware there are very few such public appointments for the oto-laryngologist. The medical inspection of school children is apt to end at inspection as far as diseases of the ear, nose, and throat are concerned. Cliniques for treatment are established for diseases of the eye and teeth. No doubt these diseases are more noticeable than ear diseases, but they are certainly not so serious. One never hears of a child dying from ocular or dental disease. I may be wrong, but I fancy that nearly 1 per cent. of all deaths are due to diseases of the ear. The recommendation of the Otological Section of the Seventeenth International Medical Congress concerning the appointment of otologists to fever hospitals was most probably put in a pigeon-hole or the waste-paper basket.

It is very desirable that all ear, nose, and throat cases in schools, fever hospitals, consumptive sanatoria, workhouses, etc., should be examined by specialists appointed for the purpose. The specialist would state the diagnosis and at least supervise the treatment. Serious cases would be admitted to hospital. If the case came to *post-mortem*, the specialist should obtain the organs in which he was interested in order that a further examination might be carried out for the advancement of medical knowledge. Money and laboratory assistance should be provided by the Hospital or University Authorities for the purpose of such investigation. In this way we could produce in this country a mass of original work to compare favourably even with that of the Central Powers, for I am sure that the British brain is just as good as, if not better than, the German or Austrian one.

The whole question really comes to this: Are we to go on with the present miserable system of competition, or are we to have co-operation, i.e. a truly national medical service? As long as we stick to competition I am afraid that only little tinkering reforms will be possible. The war will, no doubt, stir us up for a while, but I am afraid that we shall soon drift back again.

J. S. FRASER.

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**CONGENITAL APPENDAGES OR TERATOID TUMOURS OF  
THE NASAL SEPTUM.<sup>1</sup>**

BY A. BROWN KELLY, D.Sc., M.D.,

Surgeon for Diseases of the Throat and Nose, Victoria Infirmary, Glasgow;  
President Section of Laryngology, Royal Society of Medicine.

The two cases described below are examples of an interesting and rare condition:

**CASE 1.**—Female infant, aged two months, presented an outgrowth, filling the right nostril and projecting  $\frac{1}{4}$  in. beyond it. The growth was of fleshy consistence, and covered with skin continuous with that of the columella and upper lip. It measured antero-posteriorly 16 mm., and transversely 15 mm. (Fig. 1). Rhinoscopic examination revealed a rounded band extending a short distance upwards beneath the mucous membrane on the right side of the septum. In the vestibule the band widened out and passed into the columella and half-way down the upper lip. The growth was removed by Mr. R. H. Parry, to whom it appeared to consist chiefly of fat, but was inadvertently destroyed before a histological examination was made.

The patient, now twelve years of age, presents a slightly raised, but in no way disfiguring, fold of skin at the previous site of the growth. The nostrils are asymmetrical, the right measuring 18 mm. antero-posteriorly, the left 12 mm. The girl has no other malformation.

**CASE 2.**—Male infant, aged two months, presented considerable broadening and flattening of the lower part of the nose and a vertical median furrow at the tip. The columella was very broad, and from the upper part of its right edge a rounded process covered with skin projected and occupied the anterior angle of the vestibule, while from its base outside the nostril a smaller one projected upwards and outwards (Fig. 2). No operation was performed on this patient.

Only a very few similar cases have been reported.

Farlow publishes a brief description, illustrated by a photograph, of a condition which would closely resemble the present appearances in

<sup>1</sup> Photographs shown at the Laryngological Section of the Royal Society of Medicine, March 1, 1918.

Case 1, if the latter were more marked. His patient, a girl aged thirteen, had a fibrous band extending from the upper part of the cartilaginous septum in the right nostril half-way down the upper lip. It was as large round as a pencil and was very firm. Its upper end pressed against and pushed up the lateral cartilage of the right nostril, making a conspicuous and deforming lump. The opening of the nostril was much larger than that of the left side and was partially filled by the band, the lower end of which faded gradually into the tissues of the



FIG. 1.

lip. This condition had existed since birth, had never given rise to symptoms, and was merely a disfigurement. The case was examined by several surgeons, who had never seen a similar condition, and who had no theory as to how such a formation had come to exist in the situation mentioned. It was dissected out, and proved to be a very tough, fibrous band.

Haenisch reports the case of a young man who, from earliest childhood, had two appendages of about 1 cm. long and 7-8 mm. broad, attached to the septum anteriorly on the right side. The outer process had the colour of cutis; the other, about opposite the plica vestibuli

was reddish: they were of the consistence of muscle. An incision was made around the processes and they were separated from the septum. The covering was found to consist of stratified pavement epithelium, the most superficial layers of which were cornified; numerous sebaceous glands and hairs were present, and, more deeply, bundles of striped muscle fibres. In the posterior process a marked layer of flat epithelium with papillæ was seen, and in some parts at a deeper level were masses of plasma cells in the neighbourhood of vessels. Numerous mucous and serous glands with fatty tissue were also observed. As these processes of the mucous membrane of the septum contained all the normal



FIG. 2.

cell elements of this region without any being in excess, the author termed them congenital appendages of the septum, and pointed out their similarity in appearance and consistence to auricular appendages. Another developmental abnormality in this patient was the presence of a fistula, 1 cm. deep, close below the right ala, which was regarded as an incomplete cleft between nose and palate. The author states that, to his knowledge, no similar formations had previously been observed or reported.

L. Onodi describes a case of two congenital teratoid tumours of the nasal septum in a male infant which lived four days, and which presented, in addition, hare-lip and cleft palate. The tumours were rounded, separated by a furrow, and seated on the antero-inferior part



of the septum on the left side. The anterior measured 6 mm. in length and breadth; the posterior was 9 mm. long and 7 mm. broad. The microscopical examination showed them to be teratoids. The anterior was covered with skin containing papillæ with multi-layered cornified epithelium, hair follicles, and sweat and sebaceous glands; the stroma was formed of hyaline connective fibres and fibroblasts, and the bulk of the tumour consisted of a pale tissue. The posterior growth was covered with pavement epithelium and contained a tooth. The author could not find in the literature at his disposal a case on record of teratoid or teratoma of the septum.

G. J. Jenkins reports a case of epignathus or teratoid tumour of the nasal septum and base of the skull in a female child, aged one and a half years. There was a cleft of the soft palate and posterior half of the hard palate. The tumour filled this cleft, was free posteriorly, but anteriorly its mucous membrane was continuous with that on the pre-maxillary portion of the palate. The mucous membrane covering the anterior part of the buccal surface of the tumour had the characters of the membrane of the hard palate, but about the middle of this surface was a projecting tooth with a crown like an irregular molar, surrounded by a membrane like that of the alveolar gum. There was a coloboma of the iris, but no other deformity. The eyes were remarkably far apart and the face very broad. The teeth had begun to erupt a month previously, the first being that of the tumour. There was no sign, so far, of mental deficiency.

Tweedie and Keith record an interesting case of a child, aged six months, in which an ectopic pituitary descended through the roof of the naso-pharynx and occupied a mesial cleft of the soft palate. In addition there was a median hare-lip, which was continued into a groove on the columella, and a small pedunculated fibroma was attached to the left half of the upper lip. Only a very few cases of this nature have been recorded. The condition is mentioned here as it somewhat resembles that in Onodi's and Jenkins's cases.

Farlow's and my first case were very much alike. Haenisch's case had points of similarity to each of my cases. In Onodi's patient the growths were of the same nature, but seated somewhat further back on the septum; in addition hare-lip and cleft palate were present. In Jenkins's case the tumour was situated still more posteriorly in the nose, being attached to the nasal septum and base of the skull, and was also associated with cleft palate. The case recorded by Tweedie and Keith was essentially different from those under consideration, but some of the grosser manifestations were alike.

Farlow, Haenisch, and Onodi remark on the rarity of the affection. During the twelve years that have elapsed since meeting with my own cases, I have collected only those reported by the authors just mentioned and Jenkins. I can find no reference to similar formations in the encyclopædic work of Schwalbe or in Peter's *Atlas*.

In Farlow's, Haenisch's, and my cases, the situation of the appendages suggest a developmental disturbance along the line of union of the fronto-nasal and lateral maxillary processes. It would seem as if the edge of the former had been misplaced somewhat or had undergone excessive growth. In those cases in which the excised mass was examined microscopically, only normal tissue was found; on this account the term "nasal appendage" may be appropriately applied to such formations.

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- (6) SCHWALBE, E.—"Die Morphologie der Missbildungen des Menschen und der Tiere," Jena, 1913.
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## POSTSCRIPT.

Since going to press, Prof. A. Pognat has reported in the *Rev. de Laryngol.*, May 31, 1918, No. 10, another case of apparently the same nature under the title "Un cas de malformation de la narine chez un nouveau-né."

The infant, aged twenty days, presented an oval tumour-like formation, completely obstructing the left nostril, to the circumference of which it was exactly applied (see figure in original article). It had the form of the tongue of a bell and was implanted by a pedicle on the edge of the superior angle of the nostril, thus having a certain amount of mobility. It was covered with skin similar to that of the nose. No other member of the family presented a malformation of any kind. The tumour was removed by the galvano-cautery, and the nasal vestibule then appeared twice as large as that of the other side; the nasal fossa was normal. The growth measured 8 mm. in length and 5 mm. in breadth. Microscopic examination showed it to be made up merely of two adherent layers of skin. There was nothing unusual in the elements of the epidermis or dermis excepting some small inflammatory foci around the sebaceous glands; in short, it was simply a prolongation of the skin at the margin of the nostril.

In addition to this malformation the right eye presented a condition which was regarded as due to exudative iritis during intra-uterine life.

The author has not met with the report of a similar case.

## THE UNIT OF SOUND.

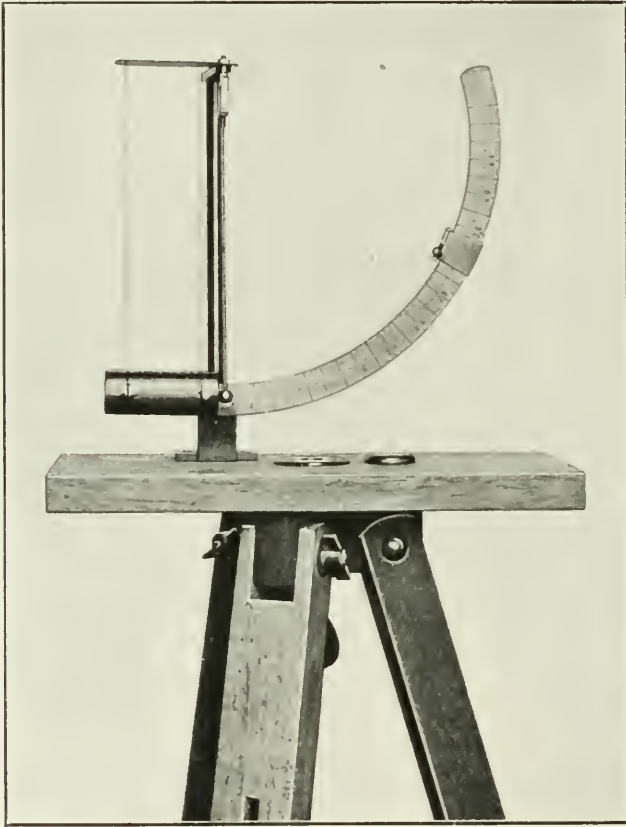
## STEFANINI'S PHONOMETER WITH BALL AND SOUNDER.

BY PROF. D. GRADENIGO,  
Naples.

IN the "Archivio Italiano di Otologia e Laringologia," 1917, p. 249, Prof. Stefanini described a new phonometer which he had devised. By means of this contrivance a sound of sharp tonality is produced by the hitting together of two little spheres with a varying intensity that can be readily determined by a simple calculation. This machine is adapted to measure absolutely in terms of "phonies" the auditive power within the zone affected by the sound. For this purpose we assume as the absolute unity of sound that corresponding to a definite mechanical energy. For example, as Stefanini suggested, the microjoule = 10 ergs, which is transformed into sonorous energy when the two spheres strike.

The sound unit which has just been described can readily be reproduced by any of these phonometers, and is absolutely independent of the examiner's power of hearing. The normal power of hearing corresponds to a fraction of a phone at a distance of two metres from the point where the two spheres strike. This fraction differs with the types of spheres employed.

To give the sound a better defined musical quality I have decided to substitute a varnished cardboard cylinder for the sphere which is



struck. This cylinder is suspended by four threads. By varying the dimensions of the cylinder within certain limits sounds of varying pitch may be obtained, as will, of course, be necessary when examining a candidate as to his auditive power in different parts of the scale. A mechanic, Corino,<sup>1</sup> has constructed three of these phonometers under my directions. The sounds given off correspond to the C of 128 vibrations, the C of 512, and the C of 2048.

The phonometer shown in the figure appended to this article is the one with the smallest sounder, corresponding in length to one-fourth the wave-length of the C having 2048 vibrations. I have suspended the

<sup>1</sup> At Turin (Physiological Institute, 30, Corso Raffaello, Turin, Italy).

striking sphere by a very thin light straw, which rotates on a horizontal axis like a weight. Stefanini had suspended the striking sphere by two threads; but in the way just described, even though the sphere is allowed to fall through quite large angles, it will always strike the sounder in exactly the same place. The sound which is produced has a distinctly musical quality. To vary the intensity of the sound the sphere is allowed to fall from different angles, which are marked on the arc of the circle. The movable support serves to determine easily the height of fall during the tests. The manner of suspension by four threads minimises the dispersion of the energy of the shock to the support. A little spirit-level, visible through the foreshortening in the figure, enables us to put the table in an exactly horizontal position.

In the figure the instrument is shown supported on a simple wooden tripod such as are used with large cameras. In order better to isolate the sound, recently constructed models of this instrument have been mounted on a little metallic tripod equipped with screws which enable one to level the table. The tripod in turn is placed on a thick iron slab.

The sound obtained on these phonometers is of an intensity superior to that usually obtained even in case the sphere is allowed to fall through the very smallest angle when one listens near by.

To a person listening at a distance of ten metres in a closed room in a direction perpendicular to the plane in which the ball falls, the normal intensity corresponds to a drop of 12 degrees of the scale. I personally have had occasion to experiment largely with this sounder (C 2048 vibrations per second) in the numerous examinations of candidates for the aviation service in the laboratory of psycho-physiological research at Turin, and can say that 12 degrees works out well in practice, and that the results correspond closely to those obtained by using the voice.

One way of exerting a check upon the replies of the candidate is by allowing the ball to drop at irregular intervals and by not allowing the candidate to use his eyes when the ball falls. The candidate is told to say simply "Yes" whenever he is sure that he hears the sound. During the examination the quietness of the room is not the only thing that must be taken into account. The gradual accommodation of the listener's ears to the sound is also to be considered. In the first place, in order that the sound be heard, it will often be necessary to drop the ball through a greater angle than that which corresponds to the sound that the candidate ought to hear; then by gradually decreasing the angle of fall after about eight or ten tries, it is easy to discover the intensity which is normal for any given set of conditions under which the examination is conducted.

This phonometer can well be used as a substitute for tests with the voice, or can be used for standardising the voice. The precisions of the results obtained and its simplicity are its recommendations. It is well known how readily the result of examinations can be varied when the voice is used.

I only add, as Stefanini suggested, that the instrument is within reach of all, is always ready for use, and is not liable to get out of order. It does not need any special attention, and does not cause the loss of any more time than would be required in tests with the voice. On the other hand, the constant character of the results are a great advantage. Let me also say that the cost is very little, and that the absolute measurement of the sound in "phonies" can easily be contrived by the manufacturing establishment which undertakes the construction of the instrument.



**THE MAXILLARY ANTRUM IN MASTOIDITIS.**

By H. BODKIN, M.R.C.S., D.O.Oxon,

Temporary Assistant Surgeon for Ear, Nose, and Throat, Bristol  
Royal Infirmary.

THE following observations on the condition of the antrum of Highmore, in cases of mastoid disease, are based on the pathological reports of a series of fifty consecutive mastoid operations performed at the Bristol Royal Infirmary.

The method is, at the conclusion of the mastoid operation, to explore the maxillary sinus of each side with the Watson-Williams exploring syringe through the middle meatus of the nose. With this syringe 10 c.c. of sterile water are thrown into the antrum, vigorously sucked in and out a few times to thoroughly wash the lining mucosa of the antrum and stir up any deposit that is present. Sufficient of the wash is finally withdrawn in the syringe, emptied into a sterile test-tube and sent to the Bacteriological Laboratory of the Infirmary under Prof. Walker Hall.

There the wash is centrifugalised. From the deposit so obtained a film is prepared and examined for cells, and culture media inoculated for growth of organism. This method of exploration gives a very fine sample of the antrum's contents for naked-eye observation at the time, of operation and subsequent microscopical examination.

All stages of infection are found, from a little excess of mucus various degrees of turbidity of cellular origin, to thick pus.

The one obvious cause of error that must vitiate the bacteriological findings is the impossibility of puncturing the nasoantral wall without contaminating the needle in its passage through the nasal mucous membrane.

To correct this as far as possible, in the following analysis reports showing merely a feeble growth of staphylococci or even streptococci are regarded as negative. Only a growth of one or both these organisms, together with polymorphonuclear cells in quantity, is called positive.

The nose is sprayed with cocaine and adrenalin before exploration to avoid contamination with blood.

The table indicates the cases in which thick pus was found, but the various appearances of milkiness or turbidity are not entered, as being too various to classify.

In this table the cases are classified as acute and chronic by the definition: Acute case, one in which there is no history of suppurative otitis media earlier than three months before operation; chronic case, one with a longer history than three months, even though it be a recent re-infection in a patient with history of discharging ears in infancy or since.

It is generally accepted that a healthy antrum is sterile.

This investigation tends to show that in cases of otorrhœa the maxillary antrum is seldom so, but, particularly in chronic cases, is almost invariably infected, even though this has not proceeded to the length of obvious empyema of the sinus.

Is this subacute or latent infection of importance?

Is it the primary seat leading to the mastoiditis?

Or is it secondary to the otitis media by a spreading infection, or does it merely represent a passive collection of pus?

This question is difficult to decide. It would appear most likely to be sometimes one, and sometimes the other. But, on the whole, the results obtained by a routine exploration give sufficient reward for its performance.

The number of times in which a very definite infection of the maxillary antrum has been found without any symptoms to suggest its presence have been very striking, and these must have been overlooked apart from this routine examination.

Possibly to be found later, when search was made to discover why the mastoid refused to heal or was so profuse in granulation tissue.

When necessary, the sphenoidal sinus can be explored at the same time; but this has not been done in these cases unless specially indicated, but infected tonsils and adenoids are removed when present.

*Percentage Table of Bacterial Infections of Maxillary Antrum found in Cases of Mastoiditis coming to Operation.*

	In total cases.	In acute cases.	In chronic cases.
	Per cent.	Per cent.	Per cent.
Both antra infected . . . .	40	25	50.0
Antrum on same side as mastoid only	30	25	33.3
Antrum on opposite side as mastoid only	12	15	10.0
Both antra sterile . . . .	18	35	6.6
One or both antra found full of pus	16	15	16.6
One or both antra infected .	82	65	93.3
The infection being 2 per cent. pneumobacilli	Staphylococci alone, 38 per cent.	Streptococci, alone, 20 per cent.	Staphylococci together with streptococci, 40 per cent.

An unexpected point brought out in this analysis has been the number of cases in which the infection has only been found on the opposite side to the mastoiditis; sometimes accompanied by a less urgent infection of the middle ear of its side, sometimes by an approximately normal ear.

It suggests the action of gravity while the patient sleeps on his side or peculiar anatomical configuration, making the two cavities of opposite sides more prone to disease.

The treatment adopted towards the antrum of Highmore in this series of cases has been guided by three factors:

First, particularly in the chronic cases, by the anatomy of the mastoid as found at the operation.

A mastoid, very cellular in structure, full of granulation tissue and pus, has obviously had but little chance to heal, apart from nasal re-infection; whereas, when dense bone, small, mastoid antrum with little contents is found, there is stronger presumptive evidence against the nasal sinuses.

Second, the naked eye appearance of the antral wash, as to excess mucus, general turbidity, or flakes.

Third, the bacteriological report.

The exploration takes but a minute at the conclusion of the mastoid operation; but little time more is taken to make an opening through the middle meatus for subsequent lavage.

Cases showing general turbidity, numerous flakes, and, in acute cases, thick pus, have been so treated, and, subsequently, washed out from time to time during the after-treatment of the mastoid. All these have quickly cleared up.

Where thick pus in quantity was found or polypoid degeneration of mucous membrane, and especially where the mastoid suggested nasal maintenance, a larger opening was made in the inferior meatus, through which subsequent treatment was carried out.

Some of these cases still had a discharge from the maxillary antrum after the mastoid was healed.

When the antral wash looked doubtful, or fairly clean, and the infection was latent—that is, only demonstrated by the bacteriological report—it has been found that the one treatment at the time of operation has, in many cases, been sufficient to cure.

While if the mastoid cavity was at all slow in cleaning up, a few washes of the maxillary antrum through puncture under local anæsthesia, followed sometimes by injection of collosol argentum or one of the various silver salts, have proved sufficient.

Similar observations on the maxillary sinus in cases of suppurative otitis media that have not come to operation show much the same results.

These have not been included in this report, as all such cases have not been explored, owing to the difficulty of doing so in small children in the time at liberty to see them.

But the cases that have been done are sufficient to convince me that it is desirable to do all, and that a routine exploration of the maxillary antrum in all cases of suppurative otitis media will discover many unsuspected infections. Is innocent of harm in itself, and, in fact, often appears to produce a beneficial effect even in those cases in which little evidence of maxillary antrum infection is revealed.

## INTRINSIC CANCER OF THE LARYNX AND THE OPERATION OF LARYNGO-FISSURE,

WITH A DESCRIPTION OF SOME NEW INSTRUMENTS SPECIALLY DESIGNED FOR IMPROVING THE TECHNIQUE.

BY IRWIN MOORE, M.B., C.M. EDIN.

(Continued from p. 178.)

### INCISION AND DISSECTION OF THE PRE-LARYNGO-TRACHEAL REGION.

In the preliminary dissection of the neck the following important points should be kept in mind:

1. Operate slowly and divide the structures carefully layer by layer.
2. Make a free, external incision, because it gives more room and facilitates the subsequent stages of the operation.
3. Use the knife as little as possible after the first incision through the skin.

Thyro-fissure, so well described by Clinton Wagner,<sup>1</sup> is not an operation for the display of brilliancy and dash: it is a tedious operation, in which, in order to secure safety, celerity should not be attempted.

If the patient is placed in the Rose or hanging-head position, an assistant should be specially instructed to keep the head steady and see that the chin, thyroid notch, and sternum are in the same straight line

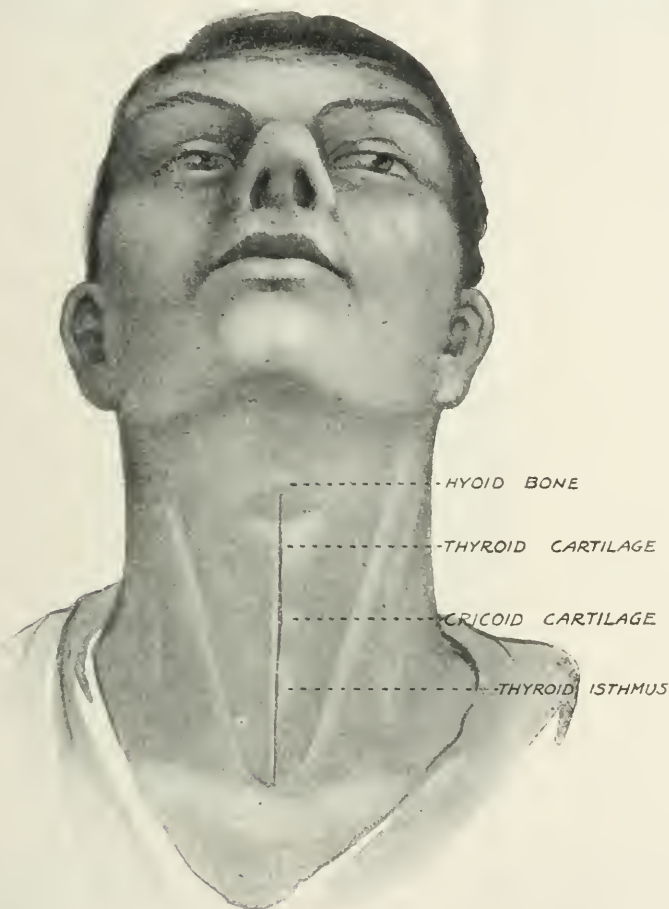


FIG. 2.—Anterior surface of the neck showing landmarks, also the position of the skin incision for the preliminary tracheotomy, and thyro- or laryngo-fissure operations.

(Fig. 2). For this purpose he should be seated on a stool above the patient's head, with his hands placed on either side of the head (Figs. 14 and 15); but if the position recommended by the author is employed (Fig. 18), an assistant at the head is unnecessary.

Standing on the right side of the patient, the operator makes a free incision exactly in the middle line of the neck from the lower border of the hyoid bone to the sternal notch dividing the skin and superficial

<sup>1</sup> *New York Med. Record*, 1896, xlix, p. 1.



cervical fascia (Fig. 2). In the tracheal region the two ends of the incision should be gradually bevelled in from the external surface at each end, the longest part of the cut being the external one. For this purpose a large-bellied knife is better than the ordinary sharp-pointed bistoury. It will be found that the superficial fascia in this situation is more of a loose, areolar tissue containing a little fat than a distinct layer. This incision exposes the superficial layer of the deep, cervical fascia, through

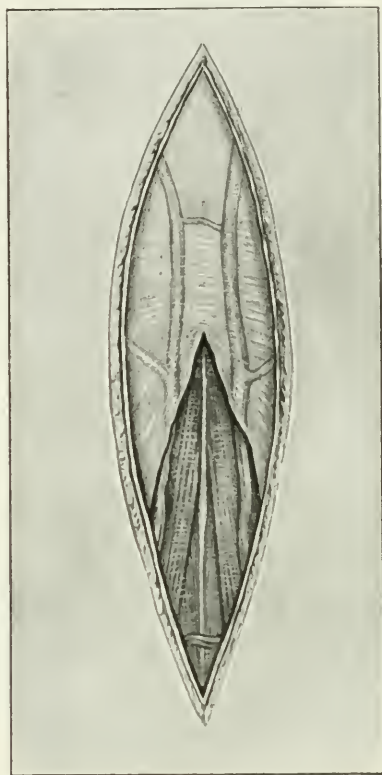


FIG. 3.—*The laryngo-tracheal region.*—The superficial fascia has been incised. The superficial layer of the deep fascia is seen in the upper half of the dissection with the anterior jugular veins embedded in it, one on each side of the middle line, whilst the communicating branches are seen crossing the middle line. The superficial layer of the deep fascia has been incised in the lower half of the dissection, exposing the sterno-hyoid and sterno-thyroid muscles. The white line of fascia between these muscles is well seen.

which the anterior, jugular veins may be seen passing down one on each side of the middle line, with a communicating branch crossing the middle line just above the sternal notch (Fig. 3). The dissection should now proceed more carefully, and the incision be still kept exactly in the middle line so as to avoid wounding these veins. On dividing the superficial layer of deep fascia with a few touches of the point of the knife, the jugular veins attached to the loose, areolar tissue may be drawn aside. If, however, they or their communicating branches are in the way, they

may be seized, divided between two compression forceps, and, later, ligatured. A single vein may exist in the middle line or to one side of it; this may also be avoided by careful dissection. The sterno-thyroid and sterno-hyoid muscles are now reached and may be recognised by the white line of firm fascia which separates them (Fig. 3). It is important to find this median interval and the muscular fibres should not be cut or torn, for considerable bleeding may occur. With a few touches of the point of the knife the incision is carried along this line, the muscles being

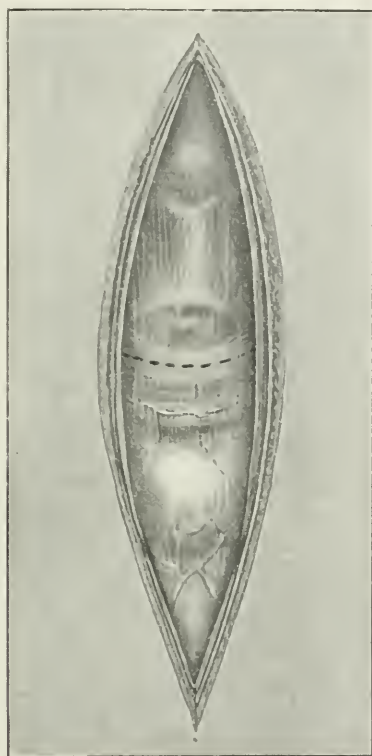


FIG. 4.—The sterno-hyoid and sterno-thyroid muscles have been separated so as to expose the deep fascia covering the thyroid and cricoid cartilages, the thyroid isthmus, and the trachea. The communicating branches of the superior and inferior veins are seen running in the fascia across the middle line. The dotted line across the cricoid cartilage indicates the position for incising the deep fascia in separating the thyroid isthmus from the trachea.

separated by the handle of the knife or dissector and widely retracted. A knife with a thin, flat handle is useful as a dissector for tearing through the connective tissue. This brings into view the deep fascia covering the underlying thyroid cartilage, crico-thyroid membrane, isthmus of the thyroid, and trachea (Fig. 4). This fascia divides at the upper border of the isthmus into two portions—one extending in front and the other behind it—whilst they unite at the lower border to pass downwards over the trachea. At this stage the rings of the trachea may be felt with the finger. There are generally seven or eight rings between the cricoid

cartilage and the top of the sternum. The isthmus of the thyroid is seen crossing the second and third rings of the trachea. Occasionally, if the isthmus is wide, it may extend as far as the cricoid cartilage and as far down as the third or fourth rings. Lying on the crico-thyroid membrane in the middle line will be seen a gland (Fig. 4)—the pre-laryngeal gland<sup>1</sup>—in the space between the crico-thyroid muscles. Sometimes there are two glands (1 in 6). The lymphatic vessels which proceed from the sub-

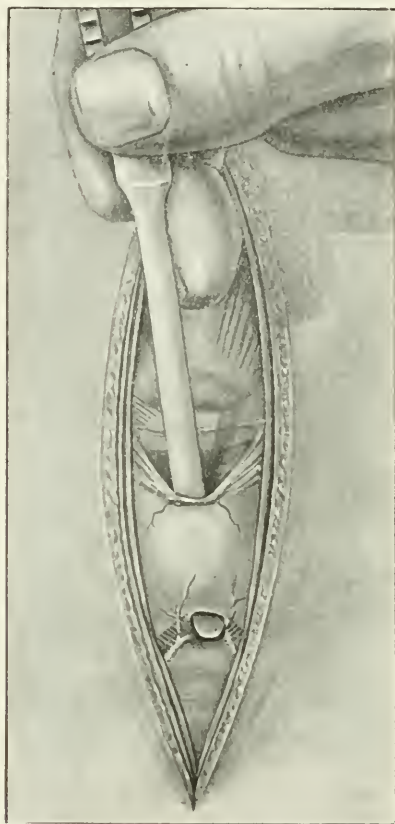


FIG. 5.—Separation of the thyroid isthmus from the trachea by first incising the deep fascia attached to the cricoid cartilage and then undermining it with an elevator. Shows the superior thyroid veins drawn down with the reflected fascia.

glottic region of the larynx pass through the crico-thyroid membrane to this subcutaneous gland, or, when absent, the lymphatic trunk vessels pass direct without any anastomosis into neighbouring lymphatic systems (Cunéo)<sup>2</sup> into inferior lateral glands between the larynx and carotid. This pre-laryngeal gland, when present, is the first one involved in the

<sup>1</sup> Poirer, *Ann. des Mal. de l'Oreille du Larynx*, etc., May, 1887. Abstract, *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1887, i, p. 309.

<sup>2</sup> P. Poirer and B. Cunéo (Paris), "The Lymphatics," English edit., by Cecil H. Leaf, 1903.





*Temporary Tracheotomy.*—Some surgeons (amongst others Chevalier Jackson) open the larynx directly without a previous tracheotomy, the anæsthetic being maintained through the open larynx or by means of an inhalation insufflation tube passed through the mouth. Experience, however, has proved the necessity and great advantages of a preliminary tracheotomy, for by this means, along with tamponage of the trachea above the cannula, blood and septic matter are prevented from passing into and obstructing the air-passages, so that the risk of septic bronchitis

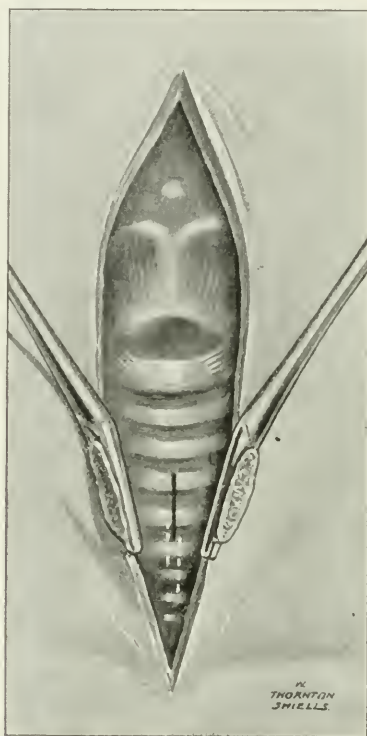


FIG. 8.—The thyroid isthmus divided and clamps attached. The black line indicates the position of the incision in the trachea for median tracheotomy. The white dotted lines (which it has been necessary in the drawing to place a little to each side of the middle line) represent the alternative incisions in the trachea for a low tracheotomy, *i. e.* through the fourth and fifth or fifth and sixth rings.

and pneumonia is avoided; also free and proper respiration is assured, together with the safe and continuous administration of the anæsthetic. Tracheotomy is a simple operation which should always be performed before opening the larynx.

The question of whether a median or low tracheotomy should be performed may now be considered. A *median tracheotomy* is intermediate between the high and low operation, the incision in the trachea being made through the third and fourth rings (Figs. 8 and 12). The advantages of this operation are that the trachea is not so deep as in the low

operation, whilst there is ample room above the tracheotomy tube to allow for the operation on the larynx.

*Thyroid Gland Clamp Forceps* (Fig. 6).—These forceps are of use in clamping each side of the thyroid isthmus before division and ligaturing. It is advisable to ligature the isthmus on each side after division, even though its vascularity may be only slight, so as to avoid not merely the

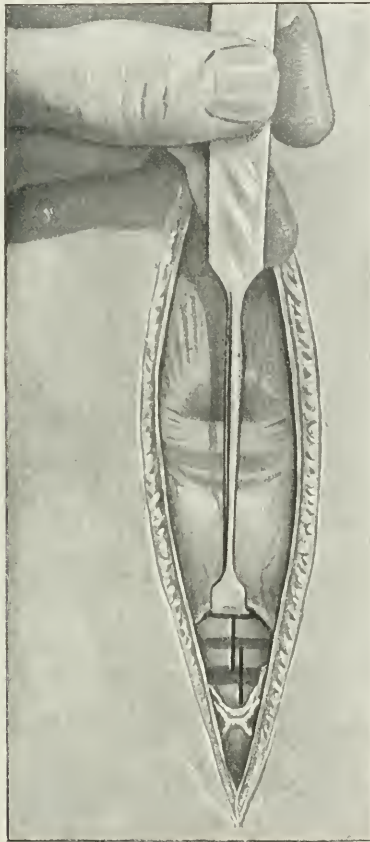


FIG. 9.—*Low Tracheotomy.* Shows the deep cervical fascia separated below the thyroid isthmus, the lower border of which is raised up by means of a retractor, thus exposing the fourth and fifth rings of the trachea. It will be seen that the inferior thyroid plexus of veins is drawn downwards out of the way along with the deep fascia. The black line indicates the alternative positions of the tracheal incision in a low tracheotomy, *i. e.* through the fourth and fifth or fifth and sixth rings.

chance of secondary hæmorrhage, but also risk of acute thyroidism, which has occasionally occurred as a sequel and depends upon the unregulated, excessive absorption of thyroid secretion into the system.

The symptoms are mainly those of rapidity of the pulse and extreme restlessness, and may appear within a few hours of operation.

The forceps (Fig. 6) are made on the principle of the Spencer Wells angular forceps, but have the outer surfaces of the blades flattened to

facilitate their introduction between the thyroid isthmus and the trachea, whilst the inner surfaces are very finely serrated. The blade measures  $1\frac{1}{2}$  in. in length. If the isthmus is broad, each half may be separately clamped and ligatured in two portions, and for this purpose four of these forceps may be required.

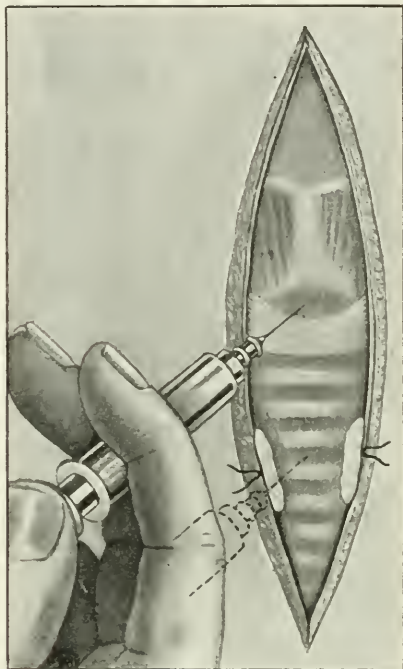


FIG. 10.—The two halves of the thyroid isthmus have been divided, ligatured, and the clamps removed. Shows positions where the hypodermic needle should be inserted, for cocaineisation of the larynx and trachea.

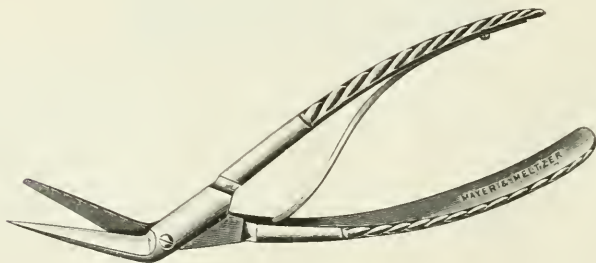


FIG. 11.—Tracheal shears.  $\frac{1}{2}$  scale.

Fig. 8 shows the clamp forceps attached to the two halves of the thyroid isthmus after separation in the middle line, together with the correct position of the incision in the trachea—*i. e.* through the third and fourth rings—for the introduction of the tube in the median operation of tracheotomy.

*Low Tracheotomy.*—In some cases where the neck is short and stout the distance between the thyroid cartilage and the sternum is considerably decreased, and it may be necessary to perform a low tracheotomy—*i. e.* below the thyroid isthmus—between the fourth and fifth or fifth and sixth rings of the trachea. The disadvantage of the low operation is said to be that the trachea in this situation lies deep, and is covered by the

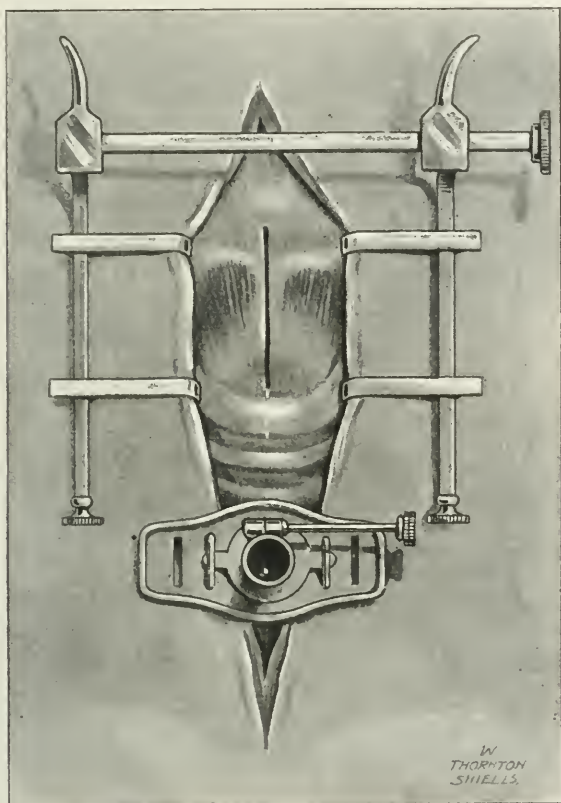


FIG. 12.—The skin and soft parts are seen held aside by a self-retaining retractor (Fig. 22) described later. Shows the correct position of a Durham's tube in the operation of median tracheotomy. The black line represents the incision made by the shears (Fig. 13) in splitting the thyroid cartilage in the operation of thyro-fissure, whilst the continuation of the incision (shown by the white dotted line) through the cricoid cartilage indicates the complete laryngo-fissure—only occasionally necessary in subglottic extension of a growth.

deep cervical fascia and fat and a quantity of areolar tissue in which the inferior thyroid plexus of veins runs; but if a slow and careful dissection is carried out by dissecting forceps, the fascia divided longitudinally or separated by tearing apart with the forceps, the veins drawn aside of downwards along with the fascia, and the lower border of the isthmus drawn upwards from the trachea by a retractor (Fig. 9), the exposure of the trachea in this region is almost as easy as a median tracheotomy.



Solis-Cohen<sup>1</sup> performs a tracheotomy first and afterwards incises the skin only so far as to uncover the larynx, thus leaving intact a bridge of skin between the thyro-fissure and tracheotomy incisions, the idea being to reduce the dimension of the external wound. Later, if more room is required, the bridge is cut through. There is nothing, however, to be gained by this procedure, for experience has shown that a free incision, by giving more room, contributes in no small way to the success of the thyro-fissure operation, and it certainly reduces the difficulties and dangers met with during a deep dissection in the trachea when performing a low tracheotomy.

Before finally opening the trachea, it is important that the operator should see that all cellular tissue covering the rings which are to be incised has been removed, and that all hæmorrhage has been stopped, and any vessels already clamped have been tied, since the leakage of blood into the trachea may become a dangerous feature.

*Cocainisation of the Larynx and Trachea.*—One of the most important points, if not the most important point, in the technique of this operation is the free use of cocaine as a local anæsthetic and hæmostatic agent.

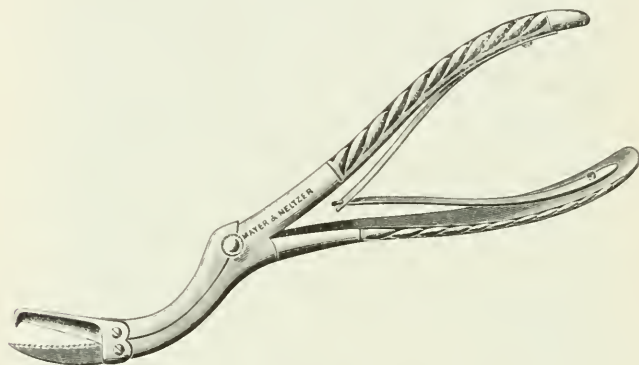


FIG. 13.—Thyroid cartilage shears.  $\frac{1}{2}$  scale.

By its application to the interior of the larynx and trachea, all sensibility of the mucous membrane, reflex cough, and capillary hæmorrhage may be controlled.

Prior to the use of cocaine the difficulties of the operation have been well described by Clinton Wagner<sup>2</sup> as follows: "The introduction of the knife, together with the flow of blood, produces violent reflex action. The larynx rises and falls spasmodically and very rapidly, and the use of a knife or scissors are fraught with danger. The operator has need at this moment of all his coolness and presence of mind. Blood will find its way into the trachea and lungs, and death on the table from asphyxia may suddenly take place."

This shows how greatly the technique has been simplified by the introduction of cocaine.

The larynx is less susceptible to the action of cocaine than the pharynx or the nose, and anæsthesia is less easily produced. It is now customary to inject 10 minims of a 2 per cent. solution of cocaine into the trachea

<sup>1</sup> *Laryngoscope*, 1907, xvii, p. 366.

<sup>2</sup> *New York Med. Record*, 1896, xlix, p. 1.

(Fig. 10) to abolish the very marked spasm which invariably occurs on opening the trachea and to avoid the coughing of mucus over the vicinity. If a short interval is allowed to elapse after the injection, a tracheotomy tube may be inserted without any reaction whatever. During the interval the operator can return to the thyroid cartilage and prepare it for splitting by separating all overlying tissue and cutting through the peri-

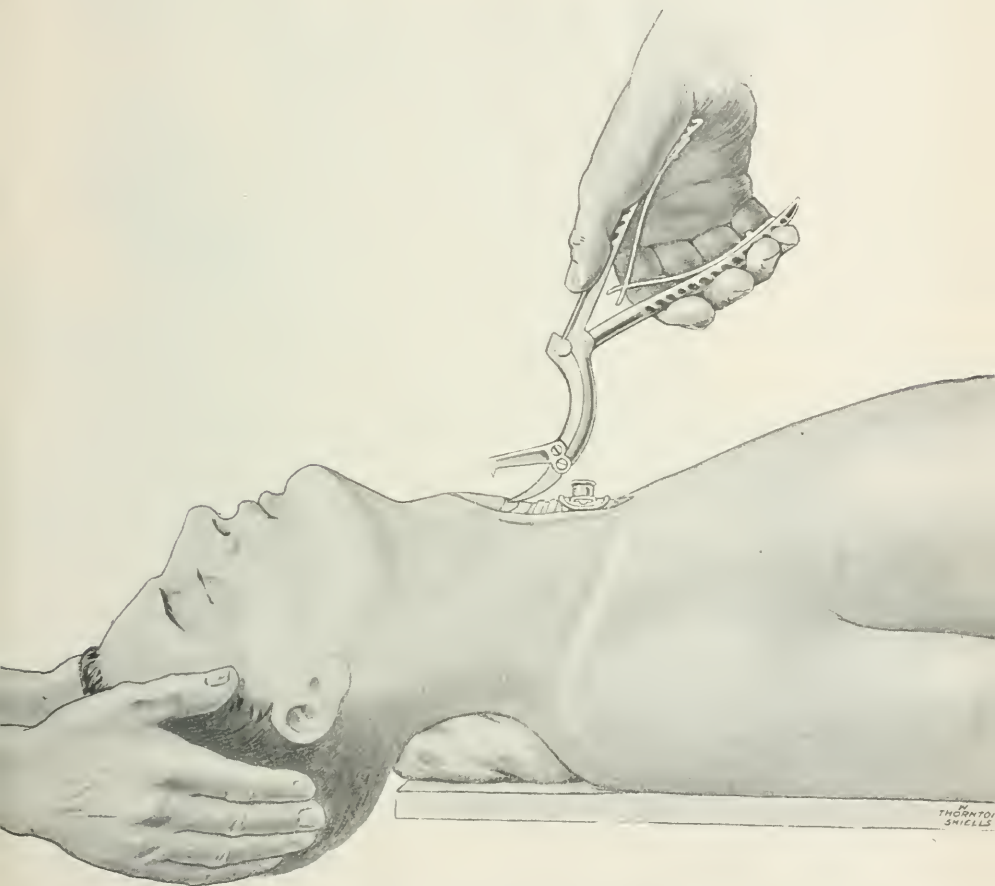


FIG. 14.—Lateral view of head and neck showing the Rose or hanging-head posture, also the correct way of introducing the lower blade of the thyroid shears through the crico-thyroid membrane into the larynx between the vocal cords.

chondrium covering it in the middle line. A second injection of cocaine should now be given through the crico-thyroid membrane into the interior of the larynx before it is opened (Fig. 10) to allay the reflex irritability of these parts, as suggested by Crosby Greene (to be referred to later).

Chevalier Jackson<sup>1</sup> also recommends that 2 c c. of a 2 per cent. solution of cocaine should be used "to forestall excessive coughing."

<sup>1</sup> "Peroral Endoscopy and Laryngeal Surgery," 1915, p. 663.

A notch may be made with the knife in the cartilage across the middle line so as to indicate the accurate apposition of its two halves after the operation is completed. Formerly it was the custom to dissect the perichondrium and all overlying tissue back from the middle line for about one inch on each side, thus leaving the bare cartilage exposed; but this should not be done, for it encourages perichondritis and necrosis of the cartilage.

As a result of the tracheal injection of cocaine and the short interval allowed to elapse, it is found that the tracheotomy tube may be inserted



FIG. 15.—The same showing position of the shears in cutting through the thyroid cartilage.

without any reaction whatever, the reflexes remaining perfectly tranquil. The respiration is so quiet after insertion of the tube that one might almost conclude that the patient had stopped breathing.

*Tracheal Shears* (Fig. 11).—These are short, sharp-pointed scissors of the turbinotome type. They are useful for tracheotomy in cases where the tracheal rings are ossified, and difficulty is experienced in cutting them with a knife. They are also useful for splitting the cricoid cartilage and opening the lower quarter of the larynx in those cases where more room is required. The point of the lower blade being sharp, they can also be used for “stabbing” the trachea if necessary in place of a knife.

## DIVISION OF THE THYROID CARTILAGE.

An incision having been made through the perichondrium covering the thyroid cartilage exactly in the middle line from its upper to its lower border (Fig. 12), the thyroid cartilage is next divided from below upwards by means of a strong pair of shears (Fig. 13) specially designed for this purpose, and if care is taken over this, one vocal cord will lie in each

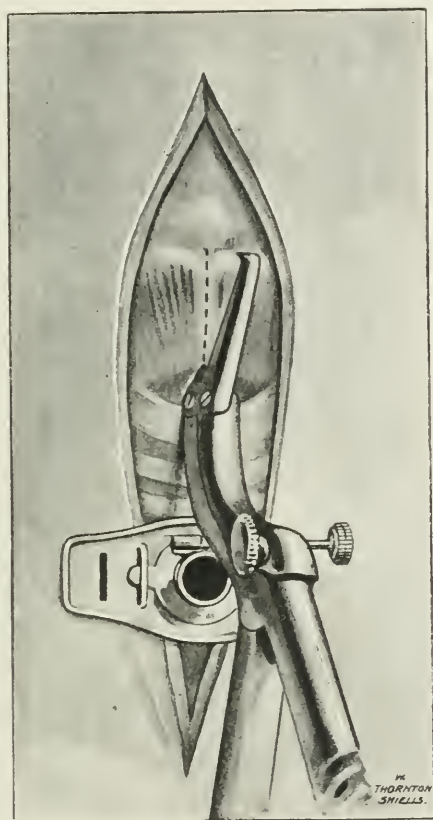


FIG. 16.—Anterior view of larynx showing the lower blade of the shears, which has been inserted through the crico-thyroid membrane between the cords, whilst the position of the upper blade is seen previous to the operator closing the handles and cutting through the cartilage. Observe that the tracheotomy tube is not in the way of the shears.

lateral half of the larynx. In the case of growths that are close to the anterior commissure it is important that the division should be made a little to one side (Fig. 19) so as to avoid cutting through the malignant growth. Cutting through a growth is always contra-indicated because of the risk of cancerous wound infection (Chevalier Jackson).

The question of splitting the thyroid cartilage from below is important, says Butlin,<sup>1</sup> "for the inner blade of the instrument working from above downwards may slit or detach one of the vocal cords at its anterior

<sup>1</sup> "The Operative Surg. of Malig. Dis.," 1900, 2nd edit., p. 199.



extremity, which, if the growth proves innocent and does not call for removal of any part of the vocal cords, almost certainly results in permanent injury to the voice."

*Thyroid Cartilage Shears* (Fig. 13) —These are used for splitting the thyroid cartilage at the angle where the two alæ meet in the middle line so as to expose the interior of the upper three-quarters of the larynx, and are also useful in splitting the cricoid cartilage in those cases where there is difficulty in reaching the subglottic extension of the growth and where additional room is required. They are very strongly made and are used in the same way as scissors. They will divide the cartilage with one clean cut without causing any crushing or damage, thus avoiding the risk of perichondritis and sepsis, which has in some cases followed the use of other instruments.

Prior to the introduction of these shears it was not uncommon to find the occurrence of necrosis of a portion of the thyroid cartilage, as a result of smashing or crushing with scissors or bone forceps.

The lower blade has a very fine saw edge to prevent lateral slipping during cutting, and is curved and pointed to facilitate its introduction through the crico-thyroid membrane, under the lower edge of the thyroid cartilage, and upwards between the vocal cords. The upper blade is provided with a sharp spike at the extremity of its cutting edge in order to assist in transfixing the larynx and keeping it steady during the cutting. The larynx can therefore be carefully divided through the anterior commissure so as not to injure either vocal cord. The position of the handles in relation to the blades is such that they lie well above the neck, so that the tracheotomy tube already inserted in the trachea does not get in the way of the operator's hands.

Experience has proved the great advantage of these cutting shears over any other instrument used for this purpose. They may also be used in the treatment of stenosis of the larynx by the operation of laryngotomy—*i. e.* laying open the larynx anteriorly by fissure of the thyroid and cricoid cartilage and keeping it open for a long period of treatment. In such a case they will divide the cartilages, whether ossified or not, and soft parts, including the skin, at one cut.

Figs. 14 and 16 show the correct way of introducing the cutting shears in the operation of laryngo-fissure. The sharp-pointed, lower blade of the instrument is seen entering the crico-thyroid membrane to reach its position between the vocal cords. It also shows the position of the patient's head, neck, and shoulders, the head being supported by an assistant so as to keep the parts in the middle line, but this is not as good a posture as that shown in Fig. 18.

Fig. 15 shows the position of the shears in cutting through the thyroid cartilage. The instrument is removed by releasing the pressure of the fingers on the lower handle, which causes the upper blade to spring back and leaves the lower blade to be withdrawn in the opposite direction to its introduction.

(To be continued.)

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## Abstracts.

## PHARYNX.

**The Plica Triangularis—a Causative Factor in the Production of Infective Foci.**—F. G. Murphy. "Laryngoscope," May, 1917, p. 409.

Embryologically and pathologically the plica triangularis has its analogy in the prepuce. Both develop about the beginning of the third month of foetal life, and at birth they should have sufficiently receded to cause no interference with the function of adjoining organs.

The plica triangularis is attached to the superior border of the posterior pillar, and to the posterior edge of the anterior pillar, and is inserted into the lateral aspect of the tongue. With the forward growth of the tongue, before and after birth, the plica may be reduced so that it apparently disappears. The plica varies in size from an inconspicuous border along the anterior pillar to a fold covering the greater part of the tonsillar fossa, as in early foetal life. Normally, the tonsillar fossa is not entirely filled by the tonsil, and the drainage is perfect as the plica has sufficiently receded so that it covers no part of the tonsil. The crypts in the tonsil are drained at frequent intervals because of the contraction of the superior constrictor and palatal muscles during swallowing. The normal tonsil is rarely inflamed except in cases of general pharyngitis. Quinsy probably never occurs in this kind of tonsil, for it is almost certain that peritonsillitis, with infection of the lymph- and blood-streams, is due to infection through and of the mucous glands and the pericapsular tissues whose ducts do not open into the tonsil.

In cases in which the plica does not normally recede, when the tongue moves backward in deglutition, the plica is carried with it and the anterior pillar is pulled to the inner side of the tonsil instead of passing to the outer side as it should do. This prevents the normal draining of the crypts and favours the formation of retention cysts. There is apparently no relation between the growth of the tonsil and the size of the plica. A large tonsil may have a large plica or one that is scarcely visible. A small tonsil may be almost entirely covered by a large plica.

The removal of foci of infection by taking away the essential part of the plica is safe, theoretically correct, and clinically efficient when properly performed. Further, it promises relief from the criticism that we are removing an organ (the tonsil) whose function is unknown. After the plica has been severed, patients often maintain that they can swallow more easily than before.

*J. S. Fraser.*

**Hemiplegia following Tonsillectomy.**—Gracey. "The Laryngoscope," January 1917, p. 40.

Gracey records the case of a male, aged nineteen, who suffered from attacks of sore throat and hoarseness. Examination showed chronic follicular tonsillitis and subacute laryngitis. The tonsils were removed under gas ether anaesthesia, the dissection method being employed. The tonsils were adherent in places. At one time the patient came out of the anaesthetic and coughed considerably. There was more hæmorrhage than usual at the time, and half an hour later there was considerable venous bleeding from the right tonsillar fossa, but this was easily

controlled. Two days later the patient complained of headache, and on the following day he went out in a cold wind. In the evening he had a chill and pain over the right frontal sinus (temperature  $105^{\circ}$  F.). Next day he had two rigors, each lasting ten minutes and the temperature reached  $106.2^{\circ}$  F. On the following day it was noted that there was weakness of the left side—especially of the arm and leg—and later there was a complete left-sided paralysis. Convulsions set in and the fever continued. Respiration developed the Cheyne-Stokes type, and death occurred ten days after operation. Unfortunately a *post-mortem* was not obtained, but Gracey notes that lumbar puncture was always negative. He suggests that the hemiplegia was due to embolism in the motor area, probably of septic origin. J. S. Fraser.

## NOSE.

**Frontal Sinus Suppuration.**—Howard A. Lothrop. "The Laryngoscope," January, 1917, p 1.

Lothrop holds that the chief factor in the prolongation of sinus suppuration is inadequate drainage. It is difficult to provide this by intranasal methods. A radical external operation on the other hand is apt to be followed by deformity. The ideal method should combine efficiency, safety, absence of deformity, and preservation of the sinus. Lothrop considers irrigation of the sinus of little practical value, and considers further that there are serious objections to radical intranasal methods, as one can never be sure just where the end of the instrument is cutting. Lothrop condemns the Ogston Luc, the Jansen, the Kunt, and the Riedel methods of operating, and holds that the Killian technique leaves much to be desired. For the last four years Lothrop has performed an operation on chronic cases which aims at being both conservative and radical. He does not give details regarding his results, but states that most of his cases have been discharged as cured in a few weeks. The relief from pain is immediate, and post-operative supraorbital anaesthesia is avoided. In all cases both sinuses were utilised in order to obtain all the floor-space the anatomy would allow regardless of whether the sinusitis was single or double. Only one-third of the cases had trouble on both sides. *Technique:* The anterior end of the middle turbinate and the adjacent ethmoidal cells are removed at a previous operation. Cocaine (4 per cent.) in adrenalin (1 to 6000) is applied on cotton to the upper anterior portion of the nasal cavity just before the general anaesthetic is begun. The patient is in the semi-upright position, eyebrow not shaven. Posterior nares plugged from pharynx. An incision is made in the eyebrow down to the bone starting just internal to the supraorbital foramen, and running median in the brow for about 1 in. The supra-orbital nerve should not be divided. Elevate periosteum and remove an oval piece of bone with small chisels. Enlarge the opening with bone forceps till it is  $\frac{3}{4}$  in. horizontally. The orbital soft parts are not to be disturbed. The sinus is then cleared of pus, granulations, or polypus. Pass a probe through the ostium frontale into the nose, and leave it in position until the cell structure around it has been broken down with small curettes. A small curved rasp is now passed into the nose through the anterior nares, and the tip made to appear in

the sinus. With this the opening is enlarged laterally and in front. Larger rasps and burrs are now introduced from below, but the work is always carried out under the guidance of vision as the instrument is seen through the external opening. The opposite sinus is opened by carefully pushing a pointed instrument through the interfrontal septum or by burring away the lower front corner of this septum. A considerable part of the ethmoid plate situated just below the sinus is removed, but the opening does not extend quite to the upper border of the septal cartilage. All the interfrontal septum and any septa that partially subdivide the sinuses are taken away. After the median partition has been burred through, it is of advantage to work through both nostrils. Finally, as much of the ethmoid mass is removed as is deemed necessary, using burrs and curettes (Tilley's and Ballenger's). The external wound is closed at once, and no drain left in the nose. Irrigation of the sinus is not begun until several days after the operation. The scar of incision should be scarcely perceptible. The bony opening is too narrow to allow depression.

*J. S. Fraser.*

**Epithelioma of the Frontal Sinus.—Dougherty.** "The Laryngoscope," January, 1917, p. 37.

Dougherty records a case of a male, aged forty-eight, who had had severe frontal headaches for one year with pain in the right eye and photophobia. Two weeks before admission he had been operated upon by a general surgeon, but had obtained no relief. Occasional attacks of dizziness were present. The operative wound in the forehead had never entirely healed. Inspection showed some bulging of the right eye and a suppurating fistulous opening over the eyebrow. The discharge was thin and ichorous. A probe introduced through the external opening met some soft resisting body. At operation the cavity of the sinus was found to be filled with a dark granulomatous mass, which on microscopic examination turned out to be epithelioma. The inferior and posterior walls of the sinus were necrotic, and there was considerable exposure of the dura. The cavity was curetted, packed with iodoform gauze, and left open. The headache and giddiness disappeared, and the patient was able to get up for several weeks. Without any preliminary symptoms he suddenly became unconscious, and died in twenty-four hours. The *post-mortem* showed purulent meningitis.

CASE 2.—Male, aged fifty, complained of headache and vertigo for several months, and had also been previously operated on. Since operation the headache and giddiness had continued, and there was a purulent discharge from the wound. Inspection showed a partially healed Killian incision with fistulous openings, discharging a thick foul-smelling pus which had excoriated the skin. An ulcer on the upper eyelid was excised, and proved to be epitheliomatous. At the second operation the frontal sinus was found to be filled with a partly disintegrated mass which extended into the right frontal lobe. The wound was left open. Dougherty notes that there was no impairment of the patient's intellect. Fourteen days after operation there was some difficulty in walking and in the finer movements of the hands. This was followed by convulsions of the left side, and later by total paralysis and coma. Autopsy showed epithelioma of the frontal lobe with extensive infiltration.

*J. S. Fraser.*



## EAR.

**Acute Otitis Media with Paralysis of the Sixth Nerve (Gradenigo Symptom-complex.—Douglas Guthrie.** "Edinburgh Medical Journal," July, 1917.

The writer describes a case of this unusual complication and gives a synopsis of the literature on the subject.

A Canadian soldier, aged twenty-one, was admitted to hospital suffering from acute otitis media. The right ear had been discharging for three weeks, and there was severe and persistent pain in the ear and temporal region. There was a history of old standing chronic otitis with occasional acute exacerbations.

The right drum had a large perforation from which small polypi were protruding. The discharge was mucopurulent and non-foetid. There was no mastoid tenderness or any sign suggestive of labyrinthitis.

On the day after admission the patient complained of double vision and was found to have a complete paralysis of the sixth nerve, as is shown in the photograph.

As the severe pain continued, a radical mastoid operation was performed. The bone was distinctly "pneumatic" in structure, and most of the cells contained sticky mucus. The dura was exposed and separated a little from the petrous bone, but no pus was here encountered.

Though much troubled by hiccup for a few days, the patient made good progress and the mastoid cavity became dry and clean.

The ocular paralysis improved so that full "abduction" of the right eye was possible two months after the operation.

A year later the patient reported that since his discharge from the Army he had been able to do light work on a farm.

Discussing the case, the writer states that otogenic paralysis of the sixth cranial nerve was first investigated by Gradenigo, who recorded a number of cases of "acute middle-ear suppuration accompanied by intense unilateral headache and paralysis of the abducent nerve."

The pathology of the condition is interesting, though it has been worked out in only a few cases.

Gradenigo, who collected fifty-three cases, describes five which were examined *post-mortem*. An abscess at the petrous apex was found in three cases, in the remaining two there was a carious focus in the same situation. Gradenigo suggests that the spread of infection takes place from the tympanum along the cells surrounding the Eustachian tube towards the apex of the petrous temporal. The sixth nerve, as it traverses the space of Dorello, is liable to be pressed upon and involved in any suppuration affecting the apical cells of the petrous pyramid.

Dorello's space is the triangular osseous-fibrous canal bounded by the petrous apex, the posterior clinoid process, and the petro-sphenoidal ligament.

Wilkinson has described a case of Gradenigo symptom-complex which proved fatal from meningitis. *Post-mortem* revealed an abscess cavity at the apex of the petrous pyramid and the track of infection was clearly demonstrable. Wilkinson thinks that such an abscess might be drained by stripping the dura from the bone.

Barr has described two cases, in which there was also optic neuritis, but which both recovered completely.

Two cases, in children, were seen by McNab, and in each case recovery followed the mastoid operation.

Mayo Collier, and Mounier have had cases in which the paralysis was bilateral, while Furet has observed a contralateral case.

*Author's Abstract.*

### Post-operative Treatment of Mastoiditis by the Carrel-Dakin Method.

—P. Moure and E. Sorrel. "Rev. de Laryng., d'Otol., et de Rhinol.," October 30, 1917.

The technique, as regards chemical constitution of Dakin's solution and Carrel's arrangement of rubber tubes, is fully described, and need not be abstracted here, since the war has familiarised it in so many British and French hospitals. But there are special points demanding mention. The surrounding skin must be protected against irritation by sterile vaseline, paraffin, or other greasy substance. (The French preparation "Gras Lumière" is excellent.—Trans.)

Excepting when the lateral sinus or an emissary vein has been opened (when the early shifting of clots would be risky), irrigation should begin two hours after operation, and be repeated every two hours. When any vein has been opened, begin forty-eight hours after operation. The dressings should be changed at least every second day. As a sequela of irrigation, even with cold solution, labyrinthine irritation has, in the writer's experience, never occurred. The unpleasantness caused by occasional penetration of liquid through the Eustachian tube is only transitory. A bacteriological control is kept by the systematic enumeration of organisms collected in a drop of pus in a platinum loop; the method described is exactly the same as in Carrel's original monograph. If the microbic count rises during treatment an intracranial complication may be suspected; the authors quote a case where this application of the method led to the discovery of a cerebral abscess. An arbitrary figure of one micro-organism to every two microscopic fields is given as indicating that healing is well under way. As a means of checking post-operative progress, the microbic count is more informative than a leucocyte count, which should, however, in all cases supplement the former at regular intervals.

From a series of tabulated results the inference to be drawn is that better results obtain in a mastoiditis, which is the *immediate* sequela of an exanthem, than in the ordinary cases resulting from chronic otitis media.

The Carrel-Dakin treatment in a majority of cases aborts the period of cicatrization, and leaves a much smaller scar; the dressings are painless.

The authors detail the histories of twenty cases, each exemplifying some of the points epitomised above. The paper deserves study in the original.

*H. Lawson Whale.*

### Diagnosis of Otitic Cerebellar Abscess.—Alfred Braun. "Rev. de Laryng., d'Otol., et de Rhinol.," October 15, 1917

Of eighty-six cases of cerebellar abscess, eighty-five were otitic in origin.

Apart from lesions of cerebellar centres themselves, it is noteworthy that injury to commissural and association fibres *between* these centres produce symptoms resembling those of vestibular lesions; lack of recognition of this point would give rise to obvious errors of diagnosis. The tests quoted by the author, for cerebellar lesions, are now familiar. But

he gives some interesting everyday examples of cerebellar ataxia or hypermetria. As that the patient, if asked to draw a series of horizontal lines to end in a given vertical line, cannot check his pencil; so that the horizontals straggle widely and irregularly beyond the vertical. Also he makes his O's and C's polygonal. The author reminds us that nystagmus on deviation, or due to caloric stimulation, tends to last a much longer time in cerebellar lesions than in labyrinthine disease.

*H. Lawson Whale.*

## MISCELLANEOUS.

**Ocular Complications of Dental Affections.**—Juan de Cruz Correa. "Rev. de Laryng., d'Otol., et de Rhinol.," September 30, 1917.

In two very similar cases described the chain of evidence definitely incriminated a molar tooth and the maxillary antrum.

One patient suffered from palpebral oedema, the other from conjunctivitis. Both were cured by dental extraction.

Among theories as to ætiology, Dr. Correa discusses "reflex" origin from the tooth, blood infection, toxæmia, and lymphatic spread from antrum to orbit. The last hypothesis will meet with most general favour.

*H. Lawson Whale.*

**Diagnosis of Early Pulmonary Tuberculosis.**—J. I. Johnston (Pittsburg). "Amer. Journ. Med. Sci.," July, 1917.

The writer refers to the vital importance and frequent difficulty of the diagnosis of early curable tuberculosis. Suspicious cases must be worked out to a confirmation by all available means. Sputum analysis is only of value when it gives a positive result. X-ray examination is inconclusive because, while damage to the lung may be apparent, no indication is given as to the activity of the disease, and the only tuberculosis of the lung that concerns us is active tuberculosis. The complement-fixation test devised by Craigie is likely to be of great value in that it not only discloses suspected cases in which physical signs are absent, but shows also that cases which are considered in a state of cure are not entirely free from infection so long as this test is positive. Pulmonary tuberculosis which can be positively diagnosed at the first examination is an established condition associated with permanent damage. An immediate diagnosis is sometimes impossible, and a statement made to the patient that one can find no active tuberculosis is an honest one, no matter what subsequent developments may occur.

*Thomas Guthrie.*

## OBITUARY.

DR. W. H. JAMIESON, MONTREAL.

DR. JAMIESON had many friends on both sides of the Atlantic. Many of us remember him as one of the pleasantest and cheeriest of Resident Medical Officers at the Throat Hospital, Golden Square, and were glad to meet him again when the British Medical Association met in Toronto in 1906.

He has for many years been associated with the Royal Victoria Hospital, Montreal, where, as First Assistant, he carried on the Throat Clinic during the absence of Dr. Birkett with the Army in France. He died suddenly last winter from a central nervous lesion.

## REVIEW.

*The Naval Hospital Ship: Fitting Out and Administration of a Naval Hospital Ship.* By Fleet-Surgeon EDWARD SUTTON, R.N. Bristol: John Wright & Sons, Ltd. Pp. 110. Price 8s. net.

Fleet-Surgeon Edward Sutton, R.N., having served in three naval hospital ships during the war, is well qualified to write this monograph. The evolution of hospital ships and their use and abuse in war according to the Geneva Convention are first described. Thereafter is a detailed account of the conversion of s.s. "Driana" into a naval hospital ship. This is followed by a full and clear statement of ordinary and emergency administrative duties. The organisation described for keeping records of patients and stores alike is very efficient, and the book should be of great assistance to the medical staff of hospital ships.

The author remarks that, owing to administrative duties, he was completely debarred from participating in clinical work, but nevertheless some of the clinical arrangements described in his book are open to criticism. Thus one medical officer did X rays and intravenous injections of galyl, whilst another was in charge of the venereal and mental wards. If one of these medical officers was a syphilologist, his duties might naturally have included both the venereal ward and specific treatment. Another medical officer was in charge of the laboratory and also of the tuberculous ward, an appointment which would demand expert knowledge in two highly specialised branches of medicine. It is possible that in this particular instance the dual qualification was available. In general, it would appear that the idea of specialism has yet to be developed in the Naval Medical Service, where officers are expected to profess an all-round proficiency to which no civil practitioner could possibly attain.

*Halliday Sutherland, R.N.*

## NOTES AND QUERIES.

### A REPRESENTATIVE COUNCIL OF BRITISH OPHTHALMOLOGISTS.

A well-attended meeting of ophthalmic surgeons and physicians was held at the rooms of the Royal Society of Medicine on Thursday, May 2, for the purpose of forming a Representative Council, chosen from among members of the Specialty, empowered to take action in matters of ophthalmological interest arising in connection with public affairs.

Mr. Treacher Collins, President of the Ophthalmological Society of the United Kingdom, was voted to the chair.

The resolution affirming that such a Council should be formed was proposed by Sir Anderson Critchett, Bt., C.V.O. He said it would meet a definite need, and would tend to weld the elements of ophthalmology more closely together, as well as making for the welfare of the public.

Mr. Richardson Cross (Bristol) seconded the resolution, remarking that Governments and governing bodies required expert advice in order to be efficient, and the best experts were those who enjoyed the confidence of their colleagues in that special line of practice. Owing to the amalgamation of the journals devoted to ophthalmology into one organ, and the representation on the Ophthalmological Society of the various similar bodies in the kingdom, the profession was now well organised, and could present a powerful front on all questions specially concerning it. He instanced ophthalmia neonatorum, Army and Navy visual standards, visual and lighting requirements in various kinds of industry, organised inquiries concerning the blind, grades of compensation payable according to degrees of visual disability, and so on.

Mr. J. B. Lawford, in supporting the resolution, said the days were rapidly passing when we could afford to ignore scientific discoveries and the new methods based upon them, and he believed more attention would be paid in the future to



the views of representative bodies, and less to the opinions of individuals, however eminent. The State was now, more and more, assuming the rôle of parent, and, like other parents, would be all the better for sound advice. He would like to see ophthalmology made a compulsory subject of the medical curriculum, a matter on which we were much behind other civilised countries. At present a man receiving the minimal qualifying medical diploma could at once take up the practice of ophthalmology, and if the proposed Committee should do no more than insist that men should not take up this work without special training, it would fully justify its formation.

Supporting speeches were made by Mr. Grey Clegg (Manchester), Sir George Berry, and Dr. G. Mackay (Edinburgh), and the resolution was carried unanimously.

It was further decided that the Council should consist of all the past and present Presidents of the Ophthalmological Society of the United Kingdom and of the Section of Ophthalmology of the Royal Society of Medicine as permanent members, four members nominated annually by the Councils of each of these Societies, and one representative from the Oxford Ophthalmological Congress.

H. DICKINSON.

(Approved by the Chairman.)

[We congratulate the British ophthalmologists and suggest that British otolaryngologists follow their good example.]

#### A SIMPLE NASAL "SPLINT."

In a case with synechiæ of the nose recently under my care I tried, after division of the adhesions, the wearing of a "splint" made of a piece of rubber taken from the palm of an ordinary rubber glove. It was put in between the opposing surfaces in a vertical position and, being very flexible, required some care in adjustment. But it was comfortable to wear and answered perfectly. The patient only had to wear it about a week, and the adhesions did not re-form. I cleaned it and re-inserted it daily.

DAN MCKENZIE.

#### NEWSPAPER PUBLISHER'S "SHIPWRECK CURE" FOR DEAFNESS.

The death is announced of Mr. William Isaac Hiffe, head of the firm of Hiffe and Sons, printers and publishers, of London and Coventry, at the age of seventy-four.

Mr. Hiffe had not for some years past taken much active part in the management of the business, spending his days quietly at his home at Coventry, where he died. His firm owned the *Midland Daily Telegraph*, which is published at Coventry.

Mr. Hiffe was one of the passengers on the steamship "Stella," belonging to the London and South-Western Railway Company's Channel Island service, which was wrecked off the Casquets on the afternoon of March 30, 1899, when about ninety lives were lost.

He used to tell how he managed to keep afloat by clinging to a furniture van until he was rescued. At the time of the disaster he suffered from partial deafness, but the shock of the accident restored his full hearing for a long time, and it was one of his little jokes to recommend anyone whose hearing was defective to try a shipwreck as an infallible remedy.

A patient with malignant disease of the throat went many years ago to consult a surgeon who had devoted much attention to laryngeal disease. The surgeon examined the case, gave his diagnosis, and recommended removal of the larynx. The patient expressed a fear that the operation was very dangerous. "Oh, no," said the surgeon, "you are sure to recover." "But," said the patient, "I understood that the operation was very serious indeed." "Well," said the surgeon, "my reason for saying that you are sure to recover is this: the mortality is 19 out of 20 and I've had 19 deaths already."

#### BOOKS RECEIVED.

**Studies in the Anatomy and Surgery of the Nose and Ear.** By Adam E. Smith, M.D. New York. 1918. Price \$4.00.

**Eye, Ear, Nose, and Throat: A Manual for Students and Practitioners.** By Howard Charles Ballenger, M.D., and A. G. Wippert, M.D. New Second Edition. Lea and Lebiger, Philadelphia and New York. 1917.

THE  
JOURNAL OF LARYNGOLOGY,  
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### REPORT OF A CASE OF PROLONGED INTUBATION.<sup>1</sup>

BY EMIL MAYER, M.D., New York City, U.S.A.,

Consulting Laryngologist to Mount Sinai Hospital, New York City; Hon. Fellow  
Philadelphia Laryngological Society; Fellow American Academy of  
Ophthalmology and Otology; Late Surgeon Throat Department,  
New York Eye and Ear Infirmary, etc., etc.

A. M——, aged nine, was admitted to the Surgical Division of Mount Sinai Hospital, New York City, on June 4, 1912, because of a tracheal fistula.

At the age of two and a half years he had an attack of diphtheria requiring tracheotomy. The tracheotomy tube was worn for over two years when it was finally removed; the opening in the trachea resulted, with constant discharge of mucus.

On June 15, 1912, a secondary tracheotomy was performed, the sutures breaking down, the fistula still remaining.

On June 20, 1912, my then associate, Dr. Sidney Yankauer, attempted to introduce a small bronchoscopic tube from above. Owing to the low position of the larynx this was very difficult, the tube passing through the larynx slightly through the vocal cords where it met with a distinct constriction which was not permeable. On July 3, he again attempted bronchoscopy, but was unsuccessful. On July 10, a dilating tube was used, 3 mm. in diameter, which passed through the constricted part of the larynx with much difficulty.

During this time, and up to October, 1912, the patient wore a tracheotomy tube.

A plastic skin transplantation was now performed, and Schrötter's tubes were passed daily without difficulty through the constriction of the larynx. He was then placed in the care of the Laryngological Department of the Hospital.

<sup>1</sup> Read before the Fortieth Annual Congress of the American Laryngological Association at Atlantic City, New Jersey, May 28, 1918.

On January 8, 1913, after repeated attempts, the bronchoscope was passed beyond the epiglottis, but was firmly held by the narrow opening in the larynx.

On January 13, 1913, under general anaesthesia, the patient was placed under suspension bronchoscopy. A large uterine dilator was now placed through the constriction, and the stenosis divulsed.

This was repeated on January 20, and again on the 27th. Following the divulsion, intubation was attempted, the tube slipping into the œsophagus and lost there. (The tube was subsequently passed through the natural passages.)

On February 10, 1913, again under ether anaesthesia, dilatation, followed this time by the insertion of a rubber tube in the following manner: A needle-eyed probe was introduced from below through the tracheal wound, and passed into the pharynx, where it was seized and withdrawn together with the strong twine which had been previously inserted; a piece of tubing was very firmly tied at its lower end by the cord at its centre. This was then drawn down past the constriction until it reached the tracheotomy opening, where it was allowed to lie, the string ends being drawn out through the tracheotomy hole and firmly tied around the patient's neck. Any protruding portion of the tube through the epiglottis was cut off. The tracheotomy tube was now reinserted below.

A week later this tube was removed, and a larger one inserted. This method was continued for the remainder of the month, when an intubation tube was successfully introduced on March 10, 1913. March 18, 1913: Extubated and re-intubated. This time the Roger's attachment with clamps on the outside was made use of. On April 23rd extubation with curetting of the granulation about the orifice of the trachea. Re-intubation: On April 26th patient coughed out his tube.

On April 28 respiration became difficult, and the tube was reinserted. This remained until May 19. Extubated again. Two days later he became cyanotic, and a tracheotomy tube promptly introduced.

From this time on the history of the patient remains about the same. In each instance, about every ten weeks, under general anaesthesia, the patient was suspended, the intubation tube seized with Mosher's extractor and removed. The sudden withdrawal of the tube always produced such marked cyanosis that intubation was immediately resorted to. The patient remained at home, went to school, and presented himself from time to time in the outdoor clinic of the hospital, where he was directed when to appear for a re-insertion and cleansing of the tube. His general health was good during all this time, and for five years he was constantly wearing the intubation tube.

He had grown tall, and this increasing stature has undoubtedly helped materially toward the ability to do away with the need for an intubation tube.

In April, 1918, almost five years since he was first intubated, his intubation tube was removed, it is sincerely to be hoped for the last time. While he became cyanotic as soon as the intubation tube was removed, as had always occurred previously, it did not seem to be so extreme. The tracheal opening being there, a small tracheotomy tube was inserted, and the patient returned to the ward.

On the second day thereafter, the tracheotomy tube was corked up, and he breathed perfectly through his larynx.

Forty-eight hours later the tracheotomy tube was removed, the neck bandaged, and he has breathed comfortably through the natural passages since that time.

The special points of interest in this case are:

1st: Persistent remaining of a tracheal fistula in spite of every faithful attempt at its closure.

2nd: A stenosis of the lower portion of the larynx due to contraction of the natural parts, and their consequent disuse.

3rd: The impossibility of intubating except under general anæsthesia and under suspension.

4th: Persistent collapse of the larynx as soon as extubated.

5th: The prolonged wearing for five years of an intubation tube.

6th: The ability to breathe through the natural passages after all these years in spite of the loss of at least two anterior rings of the trachea.

To this happy outcome must be attributed in great extent the growth of the patient, who, from a little boy of nine, and 4 ft. in height, is now nearly fifteen years old, and has attained a height of 5 ft. 5 in., with natural increase in size of all his organs, including the trachea and larynx.

This gratifying result, attained by constant and watchful care, has been largely obtained through the faithful co-operation of the anæsthetists of the hospital, Drs. Branower and Eliasberg, as also of my colleagues in the laryngological service, Dr. Yankauer and Dr. Kaempfer.

## REPORT FOR THE YEARS 1916-1917 FROM THE EAR AND THROAT DEPARTMENT, ROYAL INFIRMARY, EDINBURGH.

*Under the care of* A. LOGAN TURNER, M.D., F.R.C.S.Edin., F.R.S.Edin.

### PART I.

#### ANTRO-NASAL OR CHOANAL POLYPUS: A CLINICAL AND PATHOLOGICAL REPORT OF THIRTY-FIVE CASES.

By THOMAS EWING, B.A., B.Sc., M.B., Ch.M., F.R.C.S.Edin..

Senior Clinical Assistant.

THE following observations on antro-nasal or choanal polypus are based on an examination of the records of thirty-five cases that have been dealt with by Drs. Logan Turner and J. S. Fraser, in the Ear and Throat Department of the Royal Infirmary, Edinburgh, since 1910.

#### OCCURRENCE.

*Sex.*—The thirty-five cases examined were fairly equally divided between the sexes—nineteen females, sixteen males.

*Age.*—A striking feature—as formerly noted by Dr. A. Brown Kelly—is that the large majority occurred at ages below twenty years.

Up to 10 years	.	.	2 cases (7 years and 9 years).
11 „ 20 „	.	.	20 „
21 „ 30 „	.	.	5 „
31 „ 40 „	.	.	1 „
41 „ 50 „	.	.	5 „
51 „ 60 „	.	.	1 „
Over 60 „	.	.	1 „

*Affected Side.*—Twenty cases on left side, fifteen cases on right.



## CLINICAL FEATURES.

*Onset.*—The period, during which nasal symptoms due to the choanal polypus were complained of, varied from one month to eighteen years.

Several patients reported that they had had polypi removed on one or more previous occasions and had been relieved of their symptoms for varying periods of time. Most probably in these cases, only the nasal portion of the polypus had been removed, recurrence following from subsequent enlargement of the remaining antral portion.

*Obstruction.*—Unilateral nasal obstruction was practically invariably complained of, the obstruction was increased during attacks of "cold," and such catarrhal attacks in many cases were of frequent occurrence.

The nasal obstruction was commonly accompanied by snoring during sleep and mouth-breathing.

*Pain.*—Beyond a few cases complaining of occasional headaches, no pain whatever was complained of.

*Discharge.*—Nasal discharge, even on the affected side, was not a common symptom. Only nine cases complained of nasal discharge, seven being of a watery or mucous type, while only two patients complained of a foul purulent discharge.

*Speech.*—Nine cases showed some affection of speech. The condition usually being described as "thick speech," or else a nasal intonation—"Rhinolalia clausa."

*Ear Symptoms.*—Deafness was present in only three cases. In one case, deafness, some pain, and tinnitus were present in the ear on the same side as the affected antrum and had persisted for a few months before operation on the antrum, but there had never been any aural discharge.

Another patient said he was "temporarily deaf after blowing his nose"; while the third case was that of a boy of thirteen years, who described his sensations when sneezing as "just like a gun going off in my ear."

## ANTERIOR RHINOSCOPY.

The appearances seen on anterior rhinoscopy depend on the extent of the growth. In some cases a solitary polypus is plainly visible, usually situated far back in the middle meatus or along the floor of the nose—in other cases the nasal mucous membrane has to be contracted by using cocaine, before the polypus is visible.

In almost all cases, especially after cocainisation, a prolongation of the polypus, which is really the stalk, can be traced passing forwards and upwards, across the inferior turbinate into the posterior part of the middle meatus, and external to the middle turbinal.

After complete cocainisation this stalk can often be followed by means of a probe—bent into a small hook at its end—up to the accessory ostium of the antrum.

In most instances the polypus simply extends back towards the nasopharynx, but in five cases an anterior prolongation was also present, extending well forward into the vestibule, occasionally protruding through the anterior naris and completely blocking the nostril from vestibule to choana.

In only one-third of the cases was an excess of secretion visible and only three of these were purulent, the remaining being merely excess of mucus.

## PLATE I.



FIG. 1.—Section of distal end of cystic (?) choanal polypus ( $\times 17$ ). Shows great dilatation of lymph channel in central region of polypus; the dilated lymph channel is partly filled with *albuminous* fluid. *a*, Surface covered with mucous epithelial cells; *b*, cyst due to dilated lymph channel; *c*, albuminous fluid in cyst. N.B.—On naked-eye examination this polypus appeared to contain a true cyst. Microscopic examination, however, showed that a pseudo-cyst was present.

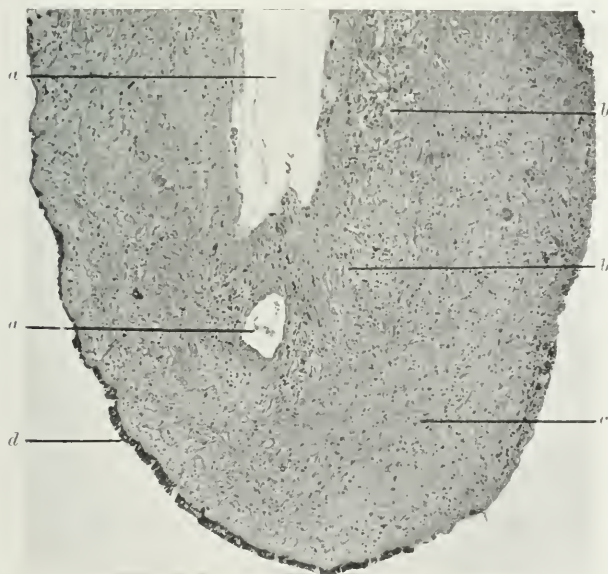


FIG. 2.—Section through distal end of cystic (?) choanal polypus ( $\times 25$ ). Lower end of polypus showing central lymph channel, and numerous lymph spaces ramifying throughout the thickened and myxomatous submucous tissue. *a*, Central lymph channel; *b*, lymph space; *c*, submucous tissue; *d*, covering membrane of mucous epithelial cells.

TO ILLUSTRATE DR. EWING'S PAPER ON CHOANAL POLYPUS.



The antro-nasal polypus is often described as being solitary; in fact, its chief nasal characteristics are that it is single and situated far back in the cavity.

In four of the cases examined, however, ethmoidal polypi were also present, in two cases in both chambers, while in the remaining two cases only in the chamber containing the antro-nasal polypus.

#### POSTERIOR RHINOSCOPY.

The general appearance of the nasopharyngeal portion of the polypus is fairly constant.

The *shape* is almost invariably spherical or globular with a smooth glistening surface, never the mulberry-like surface of the enlarged posterior end of the lower turbinated body.

The *colour* varies somewhat. As a rule it is greyish-white in appearance, but other tints are met with and described as pink, red, and pale blue.

In a few cases the colour has not been uniform. In some a dense white area has been observed, being due either to secretion or a small slough. In other cases red areas are sometimes visible.

The *size* of the pharyngeal portion varies within wide limits; when small, the polypus may be just visible, projecting through the choana, or it may be so large as to more or less completely fill the nasopharynx, interfering with the movements of the soft palate so that it is distinctly visible on examination through the mouth.

Occasionally it may be advisable to examine digitally to ascertain through which choana the polypus projects. On such examination the polypus is found to be freely movable, smooth, and soft. There is never any bleeding as there is in a case of nasopharyngeal fibroma on digital examination; but if the pharyngeal portion be cystic, the cyst may be ruptured, and a considerable quantity of fluid escape.

#### TRANSILLUMINATION.

This examination was made in thirty-two cases. In nine cases no details of the condition of the antrum were recorded; in seven of them the radical operation was not performed.

(1) In eleven cases the *affected antrum* illuminated more brightly than the other side. In three of these no details of the antral condition were given; in six the antrum contained a cystic polypus; in one case the antral mucosa was healthy, but a polypus was projecting *into* the antrum; in one case the antral mucosa was described as oedematous.

(2) In twelve cases the *affected antrum* was the darker. In four of these no details of the antral condition were recorded; in three cases the antral mucosa was markedly polypoidal and pus was present in the antral cavity; in three cases the antral mucosa was markedly polypoidal, but no pus was present; in one case the only record was "polypus in antrum"; in one case mucosa healthy, with polypus growing *into* the antrum.

(3) In seven cases both antra illuminated equally. In two of these no details were recorded; in two cases the mucosa polypoidal and pus present in one case; in two cases bluish cystic polypus in posterior part of antrum; in one case not much evident disease present.

(4) In two cases both antra were dark. In one, the antrum contained a polypus with the stalk passing across the cavity; in one case the mucosa was polypoid.



From the above data it will be noted that in thirty out of thirty-two cases the affected antrum illuminated to a greater or lesser extent.

In nine of these cases no details of the antral condition are recorded.

Of the remaining twenty-one cases, in eight the *affected* side was the brighter, in eight the *unaffected* side was the brighter, in five both antra illuminated equally.

In the eight cases in which the affected antrum was the *brighter* the antrum contained a large, clear or cystic polypus, the mucosa of the antrum being healthy, except in one case in which it was described as oedematous.

In the eight cases in which the affected side was the *darker*, the mucosa was markedly polypoid, while in three cases pus was also present.

In one case the mucosa was healthy, with a polypus growing *into* the antrum.

It is evident from the foregoing findings that transillumination is not of very great value in diagnosing the affected antrum, but, if the affected antrum can be definitely diagnosed, then transillumination may be of distinct value in obtaining some knowledge of the probable pathological condition of the antral contents before operation.

#### RADIOGRAMS.

As was first pointed out by Dr. Logan Turner and the late Dr. W. G. Porter in their book on skiagraphy of the accessory nasal sinuses, an X-ray photograph of the head is of far greater value than transillumination for diagnosing the affected antrum. It is, therefore, to be regretted that in only seven of the thirty-five cases under review was a radiogram taken; all of these seven, however, showed by the blurring of the antral cavity which was the affected side.

#### HISTOLOGY.

Fifteen cases were examined microscopically, and only one was found to be cystic or rather pseudo-cystic. The microscopical picture of the remaining seven cases closely resembled that of an ordinary nasal polypus.

The surface was covered with epithelium, which varied in type in different areas. Columnar ciliated in some parts, columnar with a layer or two of cubical cells in other parts, whilst in other areas there were only cubical cells or even a single layer of squamous cells.

This variation of the epithelial surface is mainly due to the continued pressure of the polypus against the neighbouring structures. If the pressure is continued long enough the type of epithelium becomes degraded from its normally highly specialised type of ciliated columnar down to the least specialised type, that is, squamous epithelium, and even this may be destroyed by inflammatory processes.

Some of the specimens also showed scattered here and there glandular structures opening into crypts leading down from the general epithelial surface.

The stroma consists of a more or less dense fibrous tissue, usually more cellular towards the surface and containing many immature blood-vessels with, in places, slight small-celled infiltration around the vessels.

Towards the centre of the mass the stroma becomes more fibrous with fewer but more mature blood-vessels.

## PLATE II.

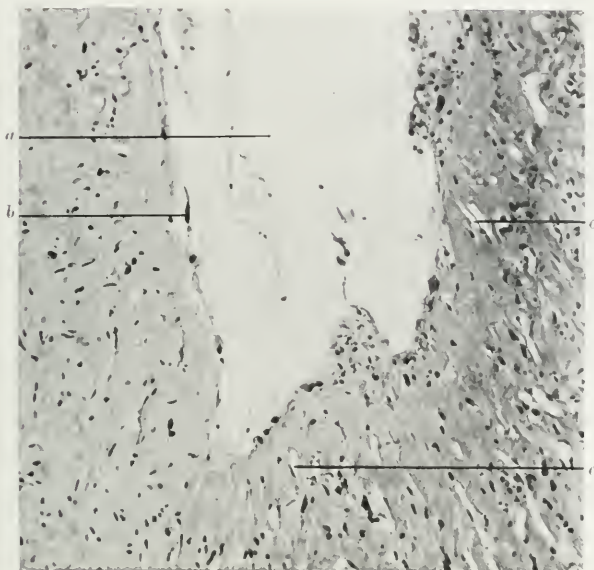


FIG. 3.—Higher power view of same section as No. 2 ( $\times 130$ ). To show that the central lymph channel is lined by endothelium and not by epithelium. *a*, Lumen of channel; *b*, endothelial cells lining channel; *c*, lymph spaces in submucous tissue.

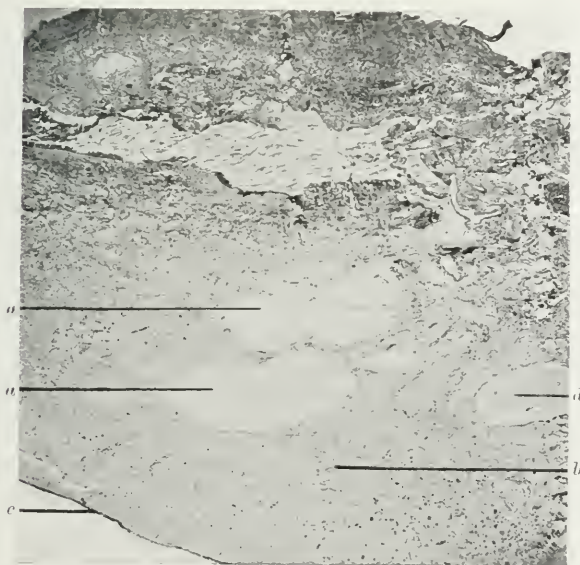


FIG. 4.—Section through choanal polypus ( $\times 25$ ). Showing marked oedematous infiltration of the submucous tissue. The delicate areolar tissue is overloaded by albuminous fluid causing separation of the tissue reticulum and so forming small pseudocysts. *a*, Pseudocysts; *b*, edematous areolar tissue; *c*, mucous surface epithelium (partly desquamated); *d*, large lymph channel.

TO ILLUSTRATE DR. EWING'S PAPER ON CHOANAL POLYPUS.



Several sections showed in places areas of blood extravasations amongst the fibrous tissue. Most of the sections also showed pseudocystic spaces scattered throughout the stroma, but mainly towards the central portions. These are not true cysts, however, as they have no lining of epithelial cells, being merely collections of œdematous fluid amongst the fibrous trabeculae. The walls of the pseudocysts are lined by endothelium (see Figs. 1-4). It is probably these false cysts that rupture when the polypus is being removed.

#### SITE OF ATTACHMENT OF POLYPUS.

In the majority of cases, on attempting to remove the polypus at operation, it collapses, due to the rupture of the false cysts in it. In such cases it becomes very difficult to make out positively the actual point of origin of the polypus.

In twenty cases no details of actual site were definitely made out.

The following table gives the site as made out in fifteen cases.

In five cases polypus was attached to floor of antrum posteriorly and close to the inner antral wall.

In two cases polypus was attached to inner wall close to accessory ostium.

In two cases polypus was attached to inner wall, near roof.

In three cases polypus was attached to inner wall in posterior part of antrum.

In one case polypus was attached to outer wall, stalk passing across cavity to the accessory ostium.

In one case polypus was probably attached to ethmoid.

In one case polypus was probably attached to ethmoid or sphenoid.

In twelve of the fifteen cases, in which the actual site was recorded, the origin of the polypus was in close proximity to the accessory ostium, being from some point on the inner antral wall far back in the cavity.

In one case, in which the actual site of attachment was not made out, it was observed that the stalk came so far forward that it was considered as passing through the ostium maxillare and not through the accessory ostium.

In one case the attachment was on the outer antral wall, the stalk passing right across the cavity and into the nose through the accessory ostium.

In another case a polypus was found, on performing a radical operation, in the antrum. The whole growth was successfully removed entire through the nose, and was then found to consist of four distinct parts:

(1) A choanal portion, extending back through the choana.

(2) An anterior portion, which reached as far forwards as the vestibule of the nose.

(3) A third portion extending into the antrum.

(4) A distinct stalk, which had obviously been torn from its attachment.

The antrum, at the radical operation, was found to be very large; the patient was a boy, aged thirteen, and the lining membrane was quite healthy. There was no point of attachment visible in the antrum, so that the polypus must have grown into the antrum. A bare area was, however, felt with the finger in the middle meatus on the affected side, about the unciform process, which may possibly have been the site of attachment.



There was another somewhat similar case. A polypus was found *in* the antrum, but evidently not *of* the antrum, as no visible attachment could be made out upon the normal lining mucous membrane. In this case also it was considered to have arisen from either the ethmoid or sphenoid.

#### ÆTIOLOGY.

The antro-nasal polypus arises from the mucous membrane of the antrum, the great majority of them from some part of the inner wall, usually posteriorly and close to the accessory ostium. The mode of origin appears to be as follows:

At first the polypus is merely a catarrhal swelling of the antral mucosa as a result of acute or chronic rhinitis. The antral mucosa, if the catarrhal condition is kept up, becomes polypoid, or a simple retention cyst may develop.

Next, part of this growth passes through the accessory ostium, or, if situated far enough forwards in the antrum, through the ostium maxillare, into the middle meatus of the nose.

How does the polypus pass into the nose? This certainly does not occur, as has been suggested (Adair Dighton) simply as an extension from the antrum, after the cyst has completely filled the cavity, for the antral portion has often been found to be quite small occupying only a small portion of the posterior part of the cavity.

Killian says it occasionally is the result of blowing the nose. This is hardly convincing, for it would appear more likely that on blowing the nose there would be a positive pneumatic pressure passing into the antrum from the nostril through the ostia, which would tend to force a polypus into the antrum rather than out of it.

Grünwald and Hajek have reported that on inflation or lavage of the antrum a polypus has occasionally been driven out of the cavity into the nose, through the ostium, *i.e.* a positive pneumatic or hydrostatic pressure exerted through the puncturing cannula forces the polypus out through the ostium situated in the posterior part of the inner wall.

Dr. J. S. Fraser suggests that the antral polypus or a piece of the swollen antral mucosa is sucked out through the accessory ostium during the act of sniffing or hawking.

During this act there is a partial negative pneumatic pressure in the nostril with a consequent passage of air from the antrum through the ostium, so that if the polypus be close to the ostium—where most of them are—it would be very readily sucked out into the nasal cavity; this, of course, would be more likely to occur in cases with a large accessory ostium.

A piece of the polypus, having passed through the ostium, becomes gripped by the edges of the ostium, is unable to return and rapidly increases in size, due more to congestion and œdema than to actual development of new tissue. It may be due to this constriction by the ostium that false cysts are developed in the polypus and so materially help in the rapid increase in size.

Obstruction to growth or increase in size is least in the posterior part of the nose and in the nasopharynx, and it is here that the maximum enlargement occurs.

It should also be noted that an almost identical condition may have its origin in one of the other accessory nasal sinuses, *e.g.* ethmoid or sphenoid.

## PLATE III.



FIG. 5.—Section through choanal polypus ( $\times 25$ ). Showing large central lymph channel into which hæmorrhage has occurred. The surrounding tissue and lymph spaces are distended and filled with albuminous fluid. *a*, Endothelial lining of lymph channel; *b*, blood corpuscles in lymph channel; *c*, lymph spaces.

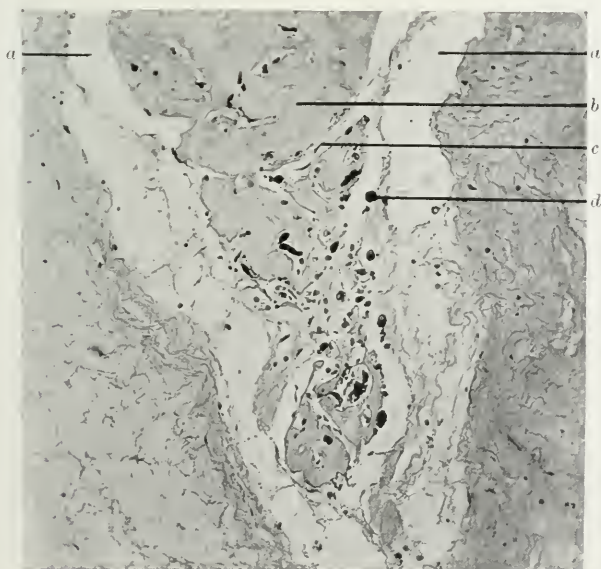


FIG. 6.—Section through choanal polypus ( $\times 130$ ). Showing (*a*) large central lymph channel containing (*b*) a mass of hyaline coagulated lymph, or altered blood clot, (*d*) numerous phagocytic cells containing blood pigment (hæmosiderin) along with (*c*) new blood capillaries penetrating into the coagulum. In other words organisation of the coagulum is taking place.

TO ILLUSTRATE DR. EWING'S PAPER ON CHOANAL POLYPUS.



This condition has been exemplified by the two cases of the present series that have been described.

Hence the necessity in order to prevent a recurrence of definitely establishing and removing the site of origin.

Another possible theory as to the mode of origin of antro-nasal or choanal polypus is that it may be due to some developmental error. When the cancellous bone in the body of the superior maxilla is absorbed and the space so formed is lined by the hollow bud of epithelium extending outwards from the middle meatus, it may happen that a small projection or fold of the mucosa is formed in the neighbourhood of the normal or accessory ostium or between the two ostia. Such an epithelial bud or fold might be sucked out through one of the ostia during sniffing or hawking and develop, as previously explained, into an antro-naso-choanal polypus.

#### TREATMENT.

Several of the patients under review reported that nasal polypi had been removed one or more times before they were cured by a radical operation on the antrum.

Further, in one of this series three operations were performed before final cure.

May 29, 1913: Antro-naso-choanal polypus removed by snare through nose.

July 27, 1914: Radical operation on affected antrum and polypus removed.

April, 1916: Second radical operation on same side, through old incision in mouth. It was found that the former opening had not been filled in with fibrous tissue and new bone; *all* the lining membrane of the antrum was removed on this occasion.

As the extent of the antral portion of the growth cannot be definitely ascertained before operation, it would appear highly improbable, except in those cases in which the antral portion is very small, that the whole of this part could be completely removed by a snare through the nostril—hence recurrence of the growth would be most probable.

Further, it is only by the direct examination, obtained by means of a radical operation, that the full extent of the antral condition can be made out and successfully dealt with.

For these reasons the operation of choice is the radical operation through the canine fossa.

#### ANÆSTHESIA.

The type of anæsthesia used will depend on the age and condition of the patient.

For children and nervous patients a general anæsthetic, given by means of a Junker inhaler, is to be preferred.

In addition the nostril and antral cavity may be locally anæsthetised with 5 per cent. cocaine, though this is better avoided in children owing to its toxic effects.

In other cases a local anæsthetic only is used, according to the method described by Dr. Syme.

#### OPERATION.

An incision is made, beginning just external to the frænum of the upper lip, in the gingivo-labial fold of mucous membrane and continued along that line, outwards, for about  $1\frac{1}{2}$  in.



The muco-periosteum is freed upwards and the lower portion of the superior maxilla laid bare.

An opening is made through the bone by gouge and mallet and enlarged if necessary with bone forceps.

The contents of the antrum can then be readily examined and dealt with under direct vision.

The lower and anterior part of the inner bony wall of the antrum is then removed, exposing the nasal muco-periosteum. A horse-shoe-shaped flap of this muco-periosteum is next turned down into the antral cavity, thus making a free counter-opening into the anterior part of the inferior meatus.

In order to facilitate the introduction of a cannula for subsequent lavage of the antrum, the anterior portion of the inferior turbinate covering the counter-opening is removed.

The gingivo-labial incision is then closed with a few catgut sutures; no packing is left in the antrum.

The after-treatment consists merely of daily lavage of the antrum for a week or two.

#### RESULTS.

The results after the radical operation have been uniformly good. The patient has been immediately relieved of nasal obstruction, and any nasal discharge has cleared up after daily lavage for a week or two.

Recurrence, even after the radical operation, has occurred in an occasional case. This has been found to be probably due to insufficient removal of the affected mucosa. Owing to the difficulties consequent upon the war, it was not considered advisable to ask patients living in the country to report themselves for re-examination. Four cases presenting themselves at the Department at periods of one, three, four, and five years after the radical operation, were found to be free from any inconvenience or evidence of recurrence.

In conclusion, I wish to tender my thanks to Mr. Logan Turner for his kind permission to make use of the clinical records of his department, and also to Dr. J. S. Fraser for his kind assistance.

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## INTRINSIC CANCER OF THE LARYNX AND THE OPERATION OF LARYNGO-FISSURE,

WITH A DESCRIPTION OF SOME NEW INSTRUMENTS SPECIALLY DESIGNED FOR IMPROVING THE TECHNIQUE.

By IRWIN MOORE, M.B., C.M. EDIN.

(Continued from p. 216.)

*Thyroid Cartilage Saw* (Fig. 17).—This is a small, fine saw which is not so cumbersome as those formerly in use. It is intended for partially sawing the larynx before using the shears in those cases in which the upper and lower edges of the thyroid cartilage are ossified.

as is so frequently met with in elderly people; or it may be used to saw partly through the whole length of the thyroid angle in the middle

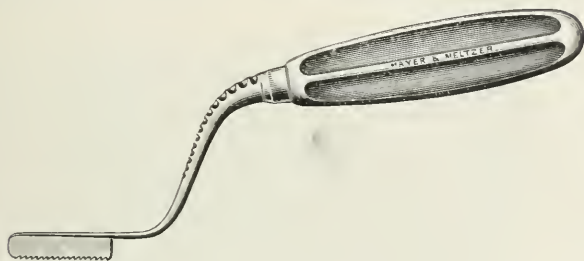


FIG. 17.—Thyroid cartilage saw.  $\frac{1}{2}$  scale.

line in order to make a groove for the cutting shears. The depth of the saw blade is only 4 mm., so that it is unlikely to do any damage to

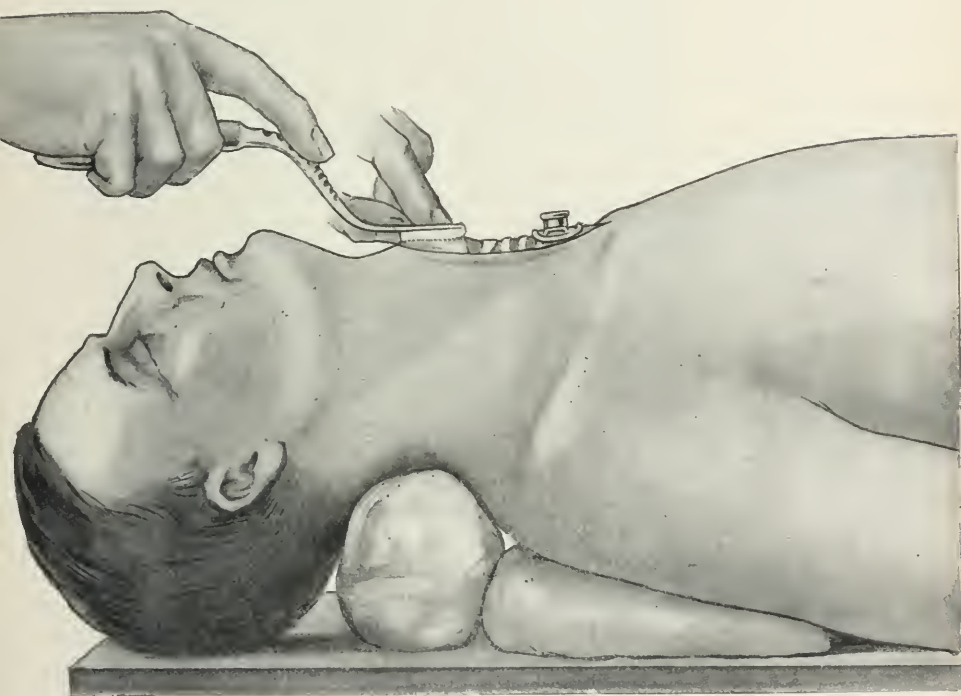


FIG. 18.—Lateral view of head and neck showing the best posture for the thyro-fissure operation, also when a low tracheotomy has to be performed. The method of holding and using the saw is seen. The thumb and first finger of the left hand are steadying the larynx, whilst also acting as support for the saw to prevent it slipping off the cartilage.

the intra-laryngeal soft parts. The shaft is bent in such a way that when the saw is used by the operator standing above the head of the patient, the patient's chin does not get in the way of the operator's

hands (Fig. 18) If it is used from below the operator's hands are well away from the neck and do not come in contact with the tracheotomy tube.

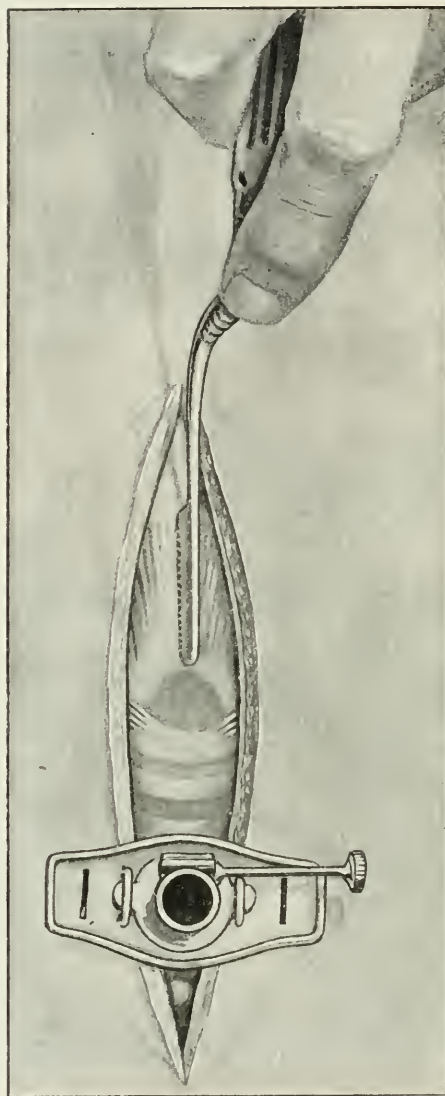


FIG. 19.—Anterior view of larynx showing position of saw or shears—slightly to the right of the middle line—so as to avoid cutting through the growth in a case where a growth on the left cord has extended to the anterior commissure.

The position of the head, neck, and shoulders as represented in Fig. 18 has been found by experience to be more satisfactory than that shown in Figs. 14 and 15, where the head hangs over the end of the

table, and causes congestion. The cushion under the shoulders produces extension of the head, whilst a sand-bag under the neck causes marked prominence of the middle line of the neck, and steadies the larynx and trachea. In this position the trachea is drawn out of the thorax, a great advantage in cases where a low tracheotomy is necessary.

If insufficient room is obtained the thyroid cartilage incision may be enlarged by continuing it upwards through the thyro-hyoid membrane and downwards through the crico-thyroid membrane. If this is done there is one entrance extending from the bottom of the hyoid bone to the top of the cricoid cartilage.

It has been advised in order to obtain extra opening of the thyroid alæ, that the crico-thyroid membrane should be divided transversely along the lower border of the thyroid cartilage, on one or both sides, as may be found necessary, or that the thyro-hyoid membrane should be divided along the upper border of the thyroid cartilage. Rarely, if ever, will this be found to be necessary. Joseph Leidy<sup>1</sup> (Philadelphia), points out that the division of the crico-thyroid membrane in this position is apt to injure subsequent vocalisation owing to the direct continuity of the vocal cords with it.

Shurley<sup>2</sup> (Detroit) refers to the anterior insertion of the true vocal cords as being blended on the sides of the crico-thyroid membrane, which explains the frequent impairment of the voice following the operation of thyrotomy if the crico-thyroid membrane is separated from the lower border of the thyroid alæ. In extension of the disease into the subglottic region the operation becomes considerably complicated, and it may be necessary to split the cricoid cartilage in order to obtain more room, but this should be avoided if possible, since the cricoid ring is the main support of the upper part of the trachea, and any damage to it or loss of substance may lead to stenosis.

#### SWABBING THE LARYNX WITH COCAINE.

Having divided the thyroid cartilage a long-handled bivalved nasal speculum should next be introduced between the two halves and gradually opened so as to expose the larynx. During this separation it may be found that a portion of mucosa in the upper half of the larynx has not been completely severed, and will require division with a knife. On entering the larynx hæmorrhage very rarely occurs: if it does, it may be easily controlled by cocaine or gauze pressure. Adrenalin solution is applied by some operators to contract the blood-vessels and lessen the immediate hæmorrhage of the excision, whilst at the same time to facilitate definition of the growth. It is recommended, however, that a piece of gauze soaked freely in a 5 per cent. solution of cocaine should be inserted into the larynx (Fig. 20), left there for a few minutes, and the speculum withdrawn; merely wiping out is not sufficient. This not only controls any laryngeal reflex, but also renders the operation area anæmic, and is also of great service in defining the limits of the growth. Cocaine alone is preferable to adrenalin or as a mixture with adrenalin, because with the latter secondary hæmorrhage is more likely to occur.

Cocaine, which was isolated by Niemann (Gottingen) in 1860, was first introduced into surgery by Koller (Vienna) in 1884 as a local anæsthetic—painted on mucous membrane—for minor operations.

<sup>1</sup> "Trans. Amer. Laryngol. Assoc.," 1886, viii, p. 17.

<sup>2</sup> "Dis. of Throat and Nose," 1900, p. 18.



To R. W. Parker<sup>1</sup> belongs the credit of first realising its importance and suggesting the use of cocaine in 1886, *i.e.* thirty-one years ago, for this operation, when he advised that after splitting the larynx the mucous

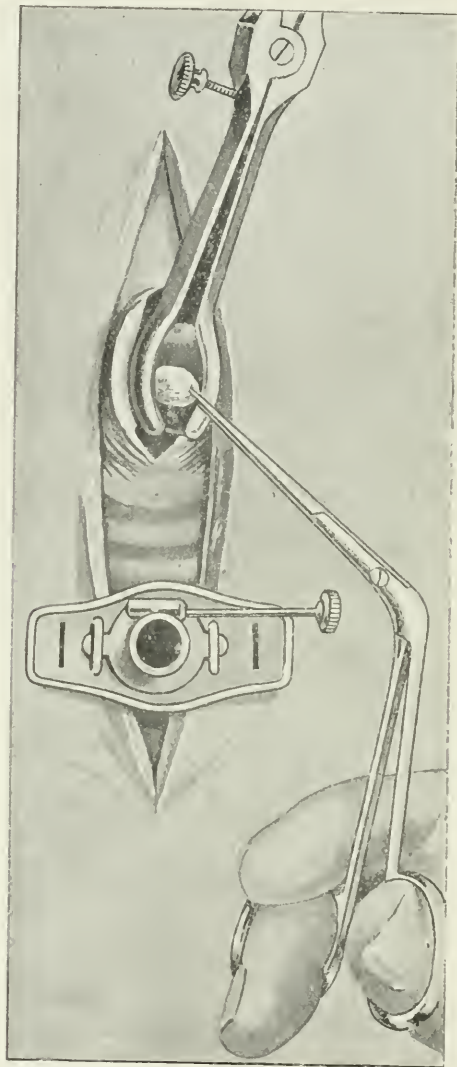


FIG. 20. — Dilating speculum in position between the severed thyroid cartilage in order to open the larynx for the introduction of a cocaine gauze swab.

membrane should be painted with a solution of cocaine "to diminish the capillary bleeding, reflex irritation, and coughing, which is invariably met with on first opening the larynx." He referred to "the difficulty of seizing the growth owing to reflex excitability which the approach of any

<sup>1</sup> "Dict. of Surgery," 1886, ii, p. 623.

instrument set up, notwithstanding deep narcosis, and says the use of cocaine in such cases materially aids the surgeon."

Jacobson,<sup>1</sup> in 1897, emphasised the great practical value of cocaine in these cases, and mentions that he got the idea from R. W. Parker.

Crosby Greene<sup>2</sup> (New York), in 1913, further improved the technique when he advised that a 1 per cent. solution of cocaine should be injected (as previously mentioned) through the crico-thyroid membrane into the cavity of the larynx, before it is opened, in order "to forestall reflex

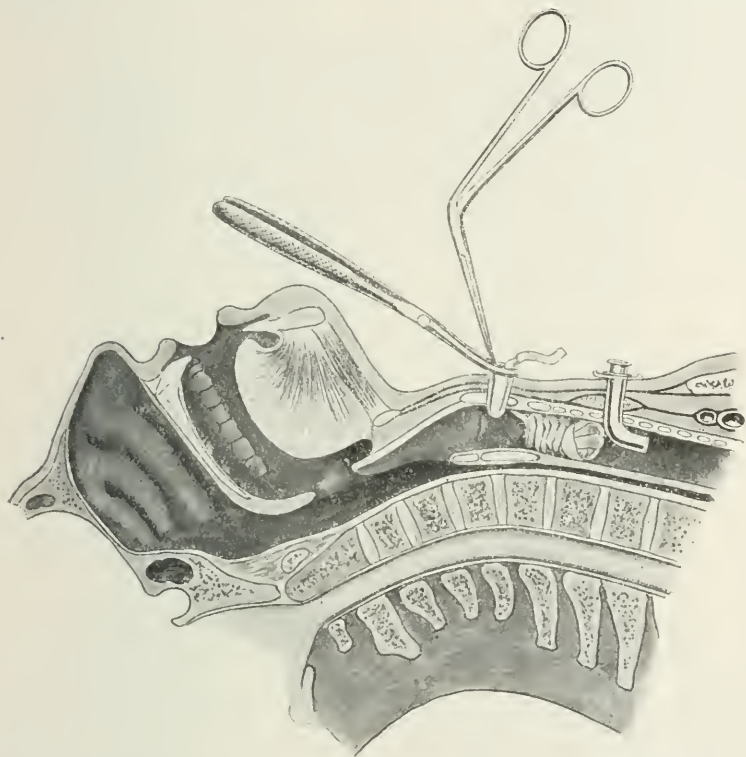


FIG. 21.—Sagittal section of the head and neck showing: (1) Importance of posture in relation to the drainage of blood or secretion from the field of operation. (2) The layers of the deep cervical fascia and position of the great vessels in relation to the over-extended position of the head and neck. (3) Position of tracheotomy tube in the trachea in median tracheotomy. (4) Gauze tampon in position above the tracheotomy tube, thus completely cutting off the trachea from the site of operation.

irritability of these parts" (Fig. 10). This important suggestion was first utilised in this country by StClair Thomson.

Crile<sup>3</sup> (Cleveland, Ohio) has confirmed the great advantages of cocaine in the surgery of the upper air passages, and has shown that the nerves in the region of the larynx and pharynx, especially around the

<sup>1</sup> "The Operations of Surgery," 1897, 3rd edit., p. 383.

<sup>2</sup> "Trans. Amer. Laryngol. Assoc.," 1913, p. 165. Abstract, *JOURNAL OF LARYNGOL., RHINOL., AND OTOL.*, 1913, xxviii, p. 662.

<sup>3</sup> *New York Med. Journ.*, December 13th-20th, 1902. Also quoted by Bodine, *Laryngoscope*, 1903, xiii, p. 261.

glottis and the terminals of the recurrent laryngeal nerve are endowed with strong inhibitory functions. Rough manipulations of these regions during operations may induce alarming and even fatal collapse due to a sudden reflex inhibition of the heart and respiration through irritation of the superior laryngeal branch of the pneumogastric nerve. In connection with the surgery of the larynx cardiac and respiratory inhibition is impossible if the area be well cocaineised. By its use, either by direct application to the mucous membrane or by infiltration of the nerve (which may be reached from the tip of the posterior cornu of the hyoid bone), operative shock is minimised or done away with, and a growth may be removed with perfect tranquillity.

Chevalier Jackson<sup>1</sup> advises a solution of 1 gr. cocaine hydrochloride and one drop of carbolic acid to 1 oz. of sterilised water, allowing the solution to stand long enough for chemical sterilisation to take place. To boil a cocaine solution, he points out, destroys its anæsthetic power.

An excellent way of preserving a solution of cocaine is to add to each fluid ounce of sterilised distilled water 2 gr. of phenol and 10 gr. of boric acid.

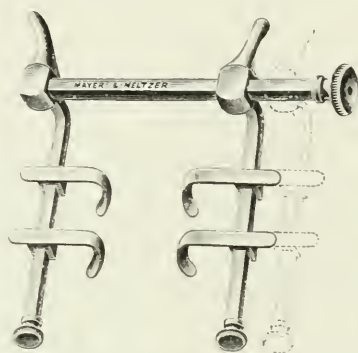


FIG. 22.—Self-retaining adjustable retractor.  $\frac{1}{2}$  scale.

Gluck<sup>2</sup> (Berlin) advises a solution of cocaine and antipyrin (5 per cent.) and carbolic acid (1 per cent.) in distilled water.

*Tamponnage of the Trachea.*—After a few minutes' interval the thyroid alae are again separated by the speculum and the gauze removed. A sponge to which is attached a tape or silk thread or preferably a tampon, as recommended by Uruñuela<sup>3</sup> (Madrid), consisting of a length of 1 in. sterilised gauze tied up at one end in a knot, is passed through the opening and packed tightly down through the trachea upon the tracheotomy tube in order that no blood may pass down (Fig. 21). A sponge tampon may also be inserted through the upper part of the larynx into the lower part of the pharynx in order to prevent saliva and mucus from passing into the larynx and covering the field of operation, but this will not often be found necessary.

*Separation of the Thyroid Alæ by Self-retaining Retractor and Examination of the Growth.*—To carry out the operation successfully it is most important that the thyroid wings should be widely separated, so that the field of operation may be fully displayed and room allowed for easy

<sup>1</sup> *Laryngoscope*, 1909, xix, p. 290.

<sup>2</sup> *Ibid.*, 1903, xiii, p. 928.

<sup>3</sup> E. Uruñuela, "Trans. 13th Internat. Cong. Med. Paris," 1900. Abstract. JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1900, xv, p. 612.

manipulation of instruments. StClair Thomson<sup>1</sup> remarks that the thyroid wings cannot be forcibly separated and that he has overcome this difficulty by "semi-dislocating the larynx on the spinal cord," thus obtaining an oblique view. Though this procedure may be useful in the initial stage when starting the perichondrial resection, it does not dispense with the necessity of hand retractors during the rest of the operation, the disadvantages of which are that traction must necessarily be irregular and unsteady, also the amount of strain that the larynx will

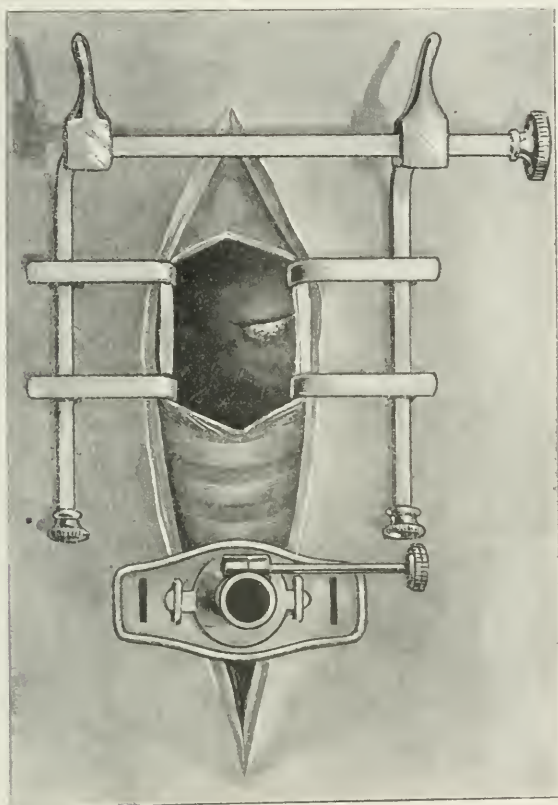


FIG. 23.—Extensive view of the open larynx obtained when the two halves of the thyroid cartilage are held apart by the author's self-retaining retractor. A malignant growth is seen on the centre of the left vocal cord. Note the ample room for the manipulation of instruments.

stand without damage cannot be estimated. To get over this difficulty the author has designed and introduced a simple, self-retaining graduating retractor (Fig. 22) which secures more ample working space, and it is especially useful after the first quarter of an inch of perichondrium has been raised from the thyroid wing, for then the retractor hooks may be inserted between the perichondrium and cartilage, and they are not in the way during the rest of the operation.

<sup>1</sup> "Proc. Roy. Soc. Med.," 1916, ix (Laryngol. Sect.), p. 8.



*Self-retaining Thyro-fissure Retractor* (Fig. 22).—This instrument is made on the principle of an abdominal retractor, and can be used either for the cervical skin incision (Fig. 12), the thyro-fissure (Fig. 23), or the complete laryngo-fissure. It is most useful for separating the lateral halves of the larynx after they have been split open by the shears and retaining them in any position. With this retractor the larynx may be opened and closed, gradually or quickly, with the greatest facility, without overstraining or damaging the two separated *alæ* of the thyroid cartilage, as may occur with ordinary hand retractors, and which may give rise to subsequent discomfort and difficulty in swallowing. By the use of this retractor a wide opening of the larynx may be assured, and a fine view of the interior of the larynx is obtained. The diseased cord is in this way readily accessible. The retracting hooks may be so adjusted, or one removed on either side, that they do not interfere with the dissection of the growth from the inner wall of the larynx (Figs. 25, 26, 27). It can also be used if necessary to hold back the skin and soft parts during the preliminary operation of tracheotomy (Fig. 12). It therefore does away with the necessity of one assistant.

The interior of the larynx must be properly illuminated, and this is best carried out by means of an electric lamp attached to a vulcanite headband and supplied from an accumulator, the light from which can be projected into the cavity of the larynx. The operation-room may also require to be darkened.

It will be observed on first opening the larynx that the appearance is quite different to the laryngoscopic view. Instead of the two white vocal cords which one expects to see, there may be, at first, difficulty in locating them. The definite landmarks of the ventricles, however, stand out well, and if these are first located, their boundaries—the ventricular band above and the vocal cord below—may then be easily made out.

The location and character of the growth can now be studied. It is generally found to be more extensive and deeper than when previously seen in the laryngoscopic mirror; what appeared to be but a small nodule may now be found to be only a small portion of the whole disease, which may perhaps have extended into the ventricle of Morgagni or the sub-glottic space. With the naked eye the growth may be seen to have a cartilaginous appearance with a clear space all round. Examination with the finger is of the greatest importance, since with a malignant growth there is a peculiar cartilaginous feel which is almost pathognomonic.

(To be continued.)

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## AN APPARENT CURE OF ENDOTHELIOMA OR SARCOMA OF THE TRACHEA WITH RADIUM EMANATIONS.

By B. SEYMOUR JONES (CAPT. R.A.M.C.T.),  
Laryngologist, 2nd-1st Southern Hospital, Birmingham.

NEW growths of the trachea have been reported so rarely that the following case merits publication:

A patient, Mrs. W—, aged forty-one, was referred to me by Dr. Alexander Bryce, of Moseley, complaining of asthmatic symptoms for two months, and dyspnoea, which was especially aggravated on lying down. For a few nights preceding the consultation, increasing difficulty in respiration had been experienced.

On examination, the patient was noticed to have considerable difficulty in breathing, on both inspiration and expiration. She was very anæmic-looking and had a somewhat bluish tinge about the facies and lips.

Nothing abnormal was observed about the *larynx* by indirect laryngoscopy, but on examination by Avellis' procedure, *i.e.* by kneeling down with the laryngoscopic mirror applied to the palate further forwards, on deep inspiration a pale, irregular, fleshy projection was seen protruding from the right side of the trachea about 3 in. below the glottis, and obscuring the view of the entrance to the bronchi.

On manual examination at the root of the neck a hard swelling could be felt, involving the attachment of the right sterno-mastoid to the manubrium sterni, this appeared to include the right side of the trachea and to fix it. The skin over it was freely movable and unaltered in appearance. No enlargement of glands could be detected.

It was decided to examine the growth by direct tracheoscopy, and arrangements were made two days later to effect this object. A preliminary intramuscular injection  $\frac{1}{100}$  gr. of sulphate of atropine was administered about an hour before the operation, and the patient was anaesthetised.

It was found impossible, however, to pass a bronchoscope, even after cocaine had been applied to the entrance to the larynx, as great respiratory difficulties arose, and after repeated attempts it was decided to abandon the examination.

The patient shortly after began to gasp and appeared as if she was suffocating, and finally she ceased to breathe. Doubtless the attack of suffocation was due to engorgement induced by the anaesthetic, and collapse of the parts. Immediate tracheotomy was done, a knife being plunged through at the root of the neck. The trachea was entered, a finger introduced, and the growth pressed aside; after a few artificial respirations the patient recovered completely.

The growth was palpated through the tracheotomy wound, and a small portion of it removed for microscopy. The tumour appeared to be about the size of a damson and almost completely occluded the trachea—it had not pushed the trachea in front of it. There was no ulceration on the surface, but it was friable. . . . It seems incredible how the patient had been able to carry on so long.

The pathological report returned that it was either an endothelioma or sarcoma.

The patient did extremely well apart from a slight rise of temperature for two days up to 100° F. During the second week she coughed up fragments of tissue which looked like growth which had possibly been rubbed off by the end of the tracheotomy tube.

A fortnight later an incision was made under an anaesthetic, outside the trachea at the root of the neck, and a radium emanation tube (strength 54 mgrm. and the screen 1 mm.) embedded deeply in the substance of the growth for twenty-four hours. Considerable reaction took place and some redness and swelling occurred for two or three days, and also great difficulty in breathing was experienced the second night, necessitating the introduction of a longer tube.

After this the patient gradually improved, and at the end of three weeks an inspection of the inside of the trachea was made through an ear speculum. The whole growth had disappeared, entirely restoring the lumen of the trachea with the exception of a small sickle-shaped

fold on the posterior wall, probably the result of the pressure of the tracheotomy tube. The hard swelling had also disappeared outside the trachea, but the skin itself was still slightly reddened and thickened over the seat of the lateral incision.

The patient has been inspected several times since, and up to the present—six months later—there has been no return of the growth. A slight puckering of the trachea anteriorly can be seen by Avellis' method, marking the site of the tracheotomy wound.

For some time subsequent to the operation she was submitted to X-ray irradiation at weekly intervals, and all thickenings of the skin at the root of the neck have now disappeared, leaving it soft and pliable.

#### PATHOLOGICAL REPORT.

##### *Microscopical Appearance of the Growth.*

For the most part it consists of masses of round cells of small medium size, freely supplied with small blood-vessels. This structure persists right up to the epithelium, which is intact and not materially altered.

I should describe it as a round-celled sarcoma, assuming that the patient is not suffering from leukaemia, lymphocythæmia, or Hodgkin's disease, which are all capable of causing a deposit of this type.

Examining the section again in the light of the above clinical history, and considering the possibility of the growth being a chronic inflammatory infiltration, I should decide that if it is inflammatory it is syphilitic.

Another pathologist to whom the section was submitted, pronounced it an epithelioma.

The Wassermann test subsequently done proved to be negative.

## SOCIETIES' PROCEEDINGS.

### ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

*President: Mr. H. J. MARRIAGE in the Chair.*

#### **Cerebro-spinal Fluid Escaping from the Ear for Twelve Months.**

—J. F. O'Malley.—Driver E. R.—, aged twenty-seven, came under my care seven months ago, with the following history: He stated that he underwent a mastoid operation, performed by Dr. Paterson, of Cardiff, about ten and a half years ago. The result was excellent for about six years, when a polypus formed and was removed. After this he emigrated to Australia, and during his two years' residence there he had polypi removed twice. About eighteen months ago he had a polypus removed at Nottingham, and the ear began to drip soon after, the escape of fluid being worse at night.

When he came under my care early in September, 1916, the condition of his ear was as follows: There was a free flow of watery fluid dripping from the lobule of the right ear and escaping from the external meatus.

The meatus was completely blocked by a smooth cyst-like swelling, which, if examined hurriedly, would be easily mistaken for a polypus. It was the scar tissue lining of the mastoid cavity, raised by the cerebro-spinal fluid from the bony facial ridge and antral cavity. There was some pus in the meatus also. After keeping him under observation for about a week, and getting the meatus as free from pus as possible, I decided to re-open the mastoid and clear out the old scar tissue and the focus which provided the pus. In doing so no difficulty was encountered, but I was unable to localise the bony defect, though I formed the opinion then that it was in the promontory. The operation cavity was packed with sterile gauze soaked in iodoform emulsion and the usual dressings applied. These were all soaked through next day by the cerebro-spinal fluid, and had to be replaced. The same condition was found on the second day and also on the third, but as he complained of discomfort all dressings were removed, when the mastoid skin wound and the whole operation cavity was found profusely bathed in pus. The cavity and wound edges were now cleaned twice daily with 40 per cent. rectified spirit and loosely packed with ribbon gauze wrung out of this solution. A material improvement set in in a few days, but the cerebro-spinal fluid continued to soak through the dressings for six weeks. As the cavity was now almost free from pus, I dusted in a little boric powder and packed it very firmly with sterile gauze each day. I was now able to localise the point from which the fluid escaped very definitely—namely, the posterior part of the attic, near the aditus. The escape of fluid gradually diminished, but even as late as December 28, 1916, that is, about three months after operation,  $1\frac{1}{2}$  dr. was collected in four hours. The leakage of cerebro-spinal fluid ceased early in January, 1917, and the mastoid wound and middle-ear cavity were soundly healed before this date, but the antral cavity has been slow to fill up and form a strong scar. It is still supported by a gauze packing inserted twice weekly, although the soldier has returned to light duty and is otherwise well. The degree of hearing in this ear is negligible, but the labyrinth responds to caloric tests.

The case seems to be of special interest for the following reasons:

(1) The large amount of cerebro-spinal fluid which a patient may lose over a long period without any apparent injury to health. I have estimated that he lost  $1\frac{1}{2}$  gallons in three months.

(2) The influence of the cerebro-spinal fluid in producing profuse suppuration in the mastoid cavity after operation.

Mr. C. E. WEST: This is an extraordinary case, both as to duration and the absence of any symptoms referable to the escape of the fluid, seeing the enormous total quantity of fluid which must have been lost. I have never seen a parallel case in which escape took place from that situation; but one is familiar with escapes of fluid through the internal auditory meatus after translabyrinthine drainage, and with cases of escape both from occipital drainage and after meningitis. Recently I have had two escapes from the lateral ventricle, but in none of them has the flow persisted beyond three weeks. It is difficult to see what could have been the cause of the prolonged escape in Mr. O'Malley's case. Was there any evidence of raised cerebro-spinal pressure? Apart from that, I can only conclude there was something in the nature of what ophthalmologists call a "filtration scar." One can scarcely conceive of there being a hole unfilled by tissue for a period of twelve months. Did the patient have headaches?

Mr. SIDNEY SCOTT: I am reminded of a similar condition in a girl whose right labyrinth I opened eleven years ago. Two or three years



later she came to the out-patient room saying that on several occasions she had noticed "water" dripping from the ear. I found that fluid having the chemical characteristics of cerebro-spinal fluid dripped from her ear for about three days at a time. As it recurred I explored the mastoid cavity and discovered the fluid escaping, not from the labyrinth, but through the planes of dura mater of the middle cranial fossa, which had been exposed at various operations. Soon afterwards the flow stopped spontaneously, and had not returned when I saw the patient for the last time three or four years ago. These cases present certain features in common with those of cerebro-spinal rhinorrhœa which Sir StClair Thomson has described and collected. A few years ago a man was under my observation at the National Hospital for the Paralysed and Epileptic suffering from violent headaches, which were relieved by the spontaneous escape of cerebro-spinal fluid from the nose. This recurred repeatedly for over a year. I think Mr. O'Malley's case probably belongs to the same category.

MR. RICHARD LAKE: The first time I removed a cochlea I took away the modiolus, and there was a free flow of cerebro-spinal fluid. As a result there was a great deal of irritation of the skin. I closed up the hole, after a fortnight, with a plug of wax. I wondered whether that might have any bearing on the cause of suppuration in the ear—namely, the irritation from this fluid. One would have thought the fluid was non-irritant.

MR. H. BANKS DAVIS: One point which interested me very much was this. The note says: "The external meatus was completely blocked by a smooth cyst-like swelling, which, if examined hurriedly, would be easily mistaken for a polypus." A child I operated upon at the hospital four years ago went into one of the other departments. From there she was referred back to the aural department with the statement that she had a polypoid cyst at the back of the ear, and a request that it be removed. I did not see the case until after an attempt had been made to remove it in the out-patient department by means of the snare. They opened a cerebral hernia. It was scraped, and the child sent home. She was brought back unconscious a week afterwards, with a temporo-sphenoidal abscess and an abscess of the cerebellum. The child is now quite well, but only as a result of extensive operations. I think the posterior wall had been removed, and the brain had been sagging down into the meatus. I always think the removal of polypi in the out-patient room should be undertaken with very great caution.

MR. O'MALLEY (in reply): I felt that I was dealing with a touchy condition, and I feared the onset of meningitis. My conclusion—if one can draw a conclusion from one case—is that the question of meningitis rests very largely on drainage. I did not begin the packing until I felt sure there was a considerable amount of granulation material. One should not immediately attempt to do firm packing in order to arrest the escape of the fluid: we should wait until there is a good covering of granulation tissue. If packing is then done, it provides a protection against infection. With regard to the profuse suppuration in the mastoid cavity after operation, it seemed very extraordinary to me, on opening the mastoid, to find pus pouring from the cavity. But nothing happened, and the man is now in far better health than at any period during the persistence of the discharge. Formerly he complained of headache and a languid feeling, but has not done so once since the flow has been completely arrested. Apparently, therefore, there is now no persistent pressure. The margins of the meatus look a little thin, and

one might have supposed there was fluid near the surface, but I tested for that, and found none. To be quite sure, however, I still pack twice a week.

**Objective and Subjective Ticking in the Ears.**—W. H. Jewell.—V. G—, a girl, aged eleven. The ticking began in the ears three months ago, and could be heard at three yards' distance, but it is not so loud now. It ceases during sleep, swallowing, or deep pressure behind the angle of the inferior maxilla, is independent of the pulse-rate, but corresponds in number and is synchronous with the clonic contractions of the tensors and levators of the soft palate, which are 150 per minute. There is neither blepharospasm, nor any movement in the tympanic membranes, corresponding to the ticking discernible.

**Squamous-celled Carcinoma of the External Auditory Meatus and Tympanum in a Young Woman aged twenty-two.**—Sydney Scott.—The following is an account of a case of malignant disease which had extensively destroyed the external osseous meatus, while a portion of the growth had invaded the tympanic cavity without destroying its bony walls or ossicles. The patient was first seen on January 26, 1917, on account of deafness and purulent discharge from the right ear. The meatus was full of what looked like granulations and a band of scar tissue which bisected the meatus in the region of the isthmus. She stated she had had intermittent otorrhœa for many years, and that it had been continuous for the previous twelve months. A small swelling formed immediately below the meatus and developed into a subcutaneous abscess, which was opened on February 1. She had no pain, nor tenderness, nor facial paralysis, nor pyrexia. The deafness was moderate and of the ordinary middle-ear type. Slight dizziness had been complained of, but the labyrinthine reflexes were normal. The nose, pharynx, left ear, and cervical lymphatic glands were unaffected.

On February 8 the inframeatal sinus, formed by the opening of the abscess a week previously, admitted a probe upwards and inwards as far as the tympanum, as the subsequent operation proved, without encountering bony resistance. The patient agreed to submit to an exploratory operation, and on February 15 the mastoid process was opened and found to contain normal air cells throughout. The meatus was then opened from behind and a tough troublesome bleeding growth, which had spread through the floor of the meatus into the inframeatal tissues of the neck, was removed. The tympanic plate had been destroyed together with the lower part of the tympanic membrane, the upper half of which was intact, with the handle of the malleus projecting from it. The antrum was then opened and seen to contain more of the growth, which here looked like a polypus projecting backwards, but not completely filling its cavity. The incus was seen to be embedded in, but not destroyed, by the growth.

The operation was completed a week later, that is, on February 23, after the histological examination had proved that the disease was carcinoma (Prof. F. W. Andrewes). The limbs of the post-aural incision were extended to the temporal region and to the angle of the jaw, and the pinna, with the surrounding skin, was reflected forwards over the cheek. The whole of the mastoid process was removed, together with the fibro-cartilaginous meatus and concha, and all parts down to and including the tympanic ring, outer attic wall, tympanic membrane, auditory ossicles, and remains of the growth which occupied the tympanum. The stapes

was left in position, likewise the labyrinth and facial nerve. Only a portion of the parotid salivary gland was removed with the main pre-auricular lymphatic gland, although this was not found to be involved. The wound was closed by suture in the usual way, and healing has taken place uninterruptedly since, but without the insertion of packing or skin grafts.

No operation for the removal of the cervical lymphatic glands has yet taken place, for it is difficult to get the patient to realise that any further operation would be likely to prolong her life or add to her future comfort.

*Comment.*—Apart from the patient's youthful age for carcinoma of the ear, the following features appear to be noteworthy:

- (1) The total absence of pain while the disease was active.
- (2) The apparently satisfactory extirpation of the growth.
- (3) Its evident origin in the meatus.
- (4) The question of the absolute necessity, or otherwise, of removing the lymphatic glands before they become obviously involved.
- (5) The prognosis in comparison with other cases of carcinoma of the ear.

Mr. C. E. WEST: Carcinomata of the meatus represent a very much larger proportion of the total number of carcinomata which are reported as carcinomata of the middle ear than most people admit. That is a point upon which I have insisted on a previous occasion. The cases all have a strong family likeness. Most of them originate in the floor of the meatus, invade the tympanum, and penetrate downwards into the neck and towards the root of the styloid process. They are locally malignant. In my experience, they have rarely had any wide distribution as glandular involvement, and, generally, they recur. (I do not know about Mr. Sydney Scott's results, which, I believe, are better than mine.) The recurrence takes place along the line of the Eustachian tube and the base of the skull, and the patient dies of infection, or meningitis, or acute encephalitis. In some cases the patient has complete freedom for a long time—sometimes permanently—after a sufficiently bold operation. I have known a patient, after two years of freedom from disease, come back and die from recurrence. I also know a patient who has survived for nine years and passed through various accidents, and yet had no recurrence of his carcinoma. One patient must now be very old, if he is still living—and I have not heard of his death. I was interested to find Mr. Scott reporting this case, because only a week last Wednesday I operated on a case of squamous-celled carcinoma of the external auditory meatus at St. Bartholomew's Hospital, and it was unlike anything I have seen before. The patient, a woman aged fifty-four, came up a fortnight before the operation complaining of trouble, apparently furuncular, in the external and auditory meatus. It was incised. A week later the woman returned with the meatus full of a fungating growth. There was a fixed mass, about the size of a filbert-nut, below the meatus. The whole of the floor of the anterior wall of the bony meatus had been destroyed, and the growth in the meatus was continuous with that in the neck, where it went downwards  $\frac{3}{4}$  in., and inwards practically as far as the styloid process. It had invaded the tympanum, but only in a polypoid way: there was no erosion of the bony walls of the tympanum. I did what I could in the region of the Eustachian tube and of the carotid canal. The points common to this case and Mr. Scott's are: The rapid growth, the destruction of the floor of the meatus, and the absence of any glandular involvement. The most important surgical question is, what should be done in

the neck if one is satisfied that the primary growth has been cleared away? In my case I could not satisfy myself on that point. The patient was a stout and flabby woman, past middle age. What I believe is right in these cases is, if there are no palpable glands, do an ordinary clearance operation but leave the sternomastoid. If there are such glands, clear everything, including the whole length of the sternomastoid muscles, the floors of both triangles, if necessary the submaxillary and parts of the parotid salivary glands, the internal jugular vein, and the whole of the overlying lymphatic structures, in a single sheet, and if possible without seeing the surface of any lymphatic gland. This method gives very good exposure, and there is astonishingly little loss of function. In one case so treated, you would not know that he had lost anything in the way of function in the neck and shoulder. You can be fairly certain, not quite, that there will be no glandular recurrence in the neck.

Mr. W. M. MOLLISON: One explanation of the absence of pain while the disease was active may be, that pain in these cases is due solely to the pressure exerted by the growth when in a closed cavity.

Mr. SYDNEY SCOTT (in reply): I do not remember any case of malignant disease of the ear free from recurrence for more than four years, except the case of rodent ulcer, but my experience is limited to twenty-one altogether. [The PRESIDENT: Were the twenty-one all carcinomatous?] They include two of rodent ulcer and four of sarcoma. An interesting point concerns the site and direction of recurrent growth, which is nearly always *in situ*, and locally very malignant. I find the disease invades the temporal fossa or involves the cervical region, and the logical procedure in the former case would be, to excise the temporal muscle, the temporo-mandibular joint, and part of the mandible-like, but I have not seen a case which justified this being done. I have, of course, removed the sternomastoid completely with the glands of both cervical triangles, but I feel uncertain whether to practise this as a routine, for the disease does not always follow this downward direction.

Mr. C. E. WEST (answering Mr. Scott): I should leave the patient alone, watching the condition of the cervical glands very carefully. If they begin to be palpable, there will be still time to clear the neck.

**Another Case of Translabyrinthine Drainage for Streptococcal Lepto-meningitis, with Recovery.**<sup>1</sup>—Sydney Scott.—The patient, G. G—, is a governess, aged twenty-four, who suffered from chronic suppurative otitis media, which had already been treated by the radical mastoid operation on each side, before she came under my observation in May, 1916, when the following history was obtained.

History: Intermittent bilateral otorrhoea and deafness began in childhood. Two years ago the left ear was treated by the radical mastoid operation by Mr. Muecke. Four months ago the right ear became painful and discharged, and six weeks later, the radical mastoid operation was done on this side by Mr. Badgerow. The earache and discharge subsided, but the patient continued to complain of headache, dizziness, vomiting, and very loud tinnitus. She developed neurasthenia, with insomnia, and was profoundly depressed mentally and showed determined suicidal tendencies. She had to be constantly watched, and, nine weeks afterwards, was examined by Dr. Hinds Howell, who was able to exclude disease of the central nervous system. A fortnight later Mr. Badgerow asked if I would take her under my care.

<sup>1</sup> The above is an almost parallel case to one recorded in the *Proc. Roy. Soc., Med.*, 1913, vii (Sect. Otol.), p. 4 and to another recorded in *ibid.*, ii, p. 11.



*Condition before Exploration.*—It was at this period (May 11, 1916), I noticed a slight internal squint of the right eye with right facial weakness, but in view of Dr. Howell's recent report this was not to be attributed to a ganglionic lesion. There was no spontaneous nystagmus or Rombergism, though the patient walked with apprehension. At this time the right mastoid-meatal cavity was occluded by scar tissue, *pressure on which caused vertical nystagmus downwards, with forced movements of the head and trunk backwards and to the right.* This "fistula symptom" was therefore unlike that usually met with in fistula of the external semicircular canal, or in the case of an unduly mobile stapes.

## HEARING TESTS.

	Right.	Left.
Low tone range limit (Bezold)	55 d. v.	90 d. v.
High tone range limit (steel monochord)	36 cm.	(Air) 36 cm.
	16 "	(Bone) 16 "
Rinne		Negative
Weber		Doubtful
Schwabach		Confused by tinnitus
Raised voice was heard and understood on both sides.		

In face of the risks I agreed to explore the right ear, and on the morning of May 17, 1916, I reopened the mastoid and tympanic cavities, removed the dense tissue and new bone which encroached upon the tympanum and meatus, and obtained a satisfactory exposure of the inner tympanic wall. No fistula either of the external semicircular canal or of the oval window was discernible, neither could any opening be discovered with the fine flexible probe. There was some erosion of the posterior part of the promontory of the cochlea, and of the Fallopian aqueduct, but the fossula rotunda was unrecognisable. I thereupon left the labyrinth alone. Next morning (May 18) the tinnitus was the same as ever, and *spontaneous nystagmus* now appeared for the first time, being directed to the left (there was no nystagmus the evening after the operation), so it seemed evident from the direction and time of onset of the nystagmus that the labyrinth was becoming in some way involved. The giddiness also increased, and any movement of the head provoked vomiting, the facial paresis was more marked. On May 19 I awaited events; the evening temperature rose to 102°-2° F., and the pulse-rate to 110. Next morning (May 20) the temperature had fallen to 99° F., and the pulse-rate to 76, suggesting an improvement, but there was now definite cervical rigidity; Kernig's sign was obtainable, while the tendon reflexes were diminished though not abolished. Moreover, the cerebro-spinal fluid, which was now withdrawn by lumbar puncture, was found to be already "cloudy" (a later report by Dr. Stansfeld stated that it contained an excess of polymorphonuclear cells and yielded a pure growth of streptococci on cultivation).

*Labyrinth and Internal Auditory Meatus Opened.*—After withdrawing 20 c.c. of cerebro-spinal fluid the vestibule and cochlea were opened through the meatus, without disturbing the sutures of the mastoid incision, and with a narrow gouge a free communication was established between the vestibule and internal auditory meatus, through which cerebro-spinal fluid escaped freely and continued so to do for several days.

The improvement which followed was rapid and continuous: in twenty-four hours the headache and cervical rigidity had disappeared; the cerebro-spinal fluid, withdrawn daily by lumbar puncture, was under less pressure, only 7 c.c. being collected, and this was "less cloudy," and in seventy-two hours was clear. The temperature returned to 98° F. and

pulse-rate to 80, no subsequent rise taking place. The patient left the hospital in three weeks, and at first experienced the usual phenomena following ablation of one labyrinth. The facial paresis and internal strabismus disappeared two or three weeks afterwards, but the tinnitus remained loud and persistent, quite unchecked by the operation for fully two or three months; subsequently it gradually ceased to trouble the patient, who in the meantime had become cheerful and well.

*Note.*—The purpose of recording this case is to emphasise the importance of *early diagnosis* of lepto-meningitis, and at the same time the value of *immediate drainage* of the meninges through the labyrinth, when the signs indicate that this has been the route of infection, just as was shown in the case which I first described in the *Archives of Otol-ogy*, 1908, xxxvii, p. 108.

DR. DAN MCKENZIE: As in this successful case, I also have been able to rescue several patients from the jaws of death by this and other means of draining the meningeal spaces. If the ease of the operation were better known, I think more men would be disposed to tackle cases of meningitis. Meningitis is regarded practically as a death-warrant, and so, often, nothing is done beyond a radical mastoid operation. But cases like Mr. Scott's show how unjustifiable it is to allow the patient to die without making an attempt to drain. I heartily support Mr. Scott's procedure in instituting prompt drainage when the diagnosis has been made; and now it is possible to make the diagnosis sufficiently early to save the patient in many cases. To decline to drain in meningitis is more justifiable than to decline to open the abdomen in peritonitis.

MR. W. M. MOLLISON: I do not agree with Dr. McKenzie. I prefer to treat these cases of lepto-meningitis not by draining to the internal auditory meatus, but by making incisions into the dura mater. These cases which I have saved have been saved in that way. I did not find opening the internal auditory meatus as easy as Dr. McKenzie suggests; possibly I did not use the right instruments. The facial nerve was always very worrying in such cases, and I found it very dangerous to establish really good drainage when I had got through. And I do not agree with Dr. McKenzie in opening through the meatus as soon as the diagnosis of meningitis is made, because so many of these early cases can be saved by continuous lumbar punctures; these—a trivial operation—during the first twenty-four hours may save the patient.

MR. C. E. WEST: I agree, to some extent, with all the speakers. The operation of translabyrinthine drainage is a remarkably easy one. It takes a very brief time after finishing the radical mastoid operation, and in many of the cases efficient drainage can be readily established, which will last four or five days; in some cases it has lasted fourteen days. But only a small proportion of the meningitis cases I have treated in this way—or in any other way—recover. One has had stray recoveries by all methods except in that of incision of the dura mater. I have incised the dura mater at various points. If nothing be interposed between dura mater and brain, the brain becomes adherent, and if gauze is interposed, it becomes infiltrated with lymph, and drainage ceases. When once withdrawn, it is impossible to put the gauze back. There are adhesions all round between brain and dura mater; in fact, I have carried out this procedure for the very purpose of establishing adhesions. I agree with Mr. Mollison that in early cases perhaps the simplest and most effective method is either continued thecal drainage or thecal lumbar puncture—both simple methods. After fairly extensive trial of every method of treating meningitis I have heard of, I am

coming back to thecal drainage as being the most hopeful way of treating cases. This matter was discussed in our Section at the International Congress of Medicine, and the further I attempt to treat cases of meningitis, the more convinced I am that the real secret, as was stated on that occasion, is that the choroid plexus blocks out the antibody. There are practically no antibodies in the cerebro-spinal fluid, and until you can get a high antibacterial content in the cerebro-spinal fluid, either by introducing it mechanically, or as an antiserum, or by altering the permeability of the plexus, the great bulk of the cases of meningitis will be lost.

MR. SOMERVILLE HASTINGS: The only cases of meningitis in which I have experienced recovery have been those treated by repeated lumbar puncture. I should like to hear from Mr. Scott whether, with a normal labyrinth, he considers it justifiable to do translabyrinthine drainage. I should also like to know something of the method Mr. West employs for continuous thecal drainage, because I have never done it, and I would like to try it.

MR. C. E. WEST (replying to Mr. Somerville Hastings): The method of continuous thecal drainage is exceedingly simple. It consists of the introduction of a suitable trochar cannula into the theca in the ordinary position of lumbar puncture. It gives the most extravagantly profuse drainage. The end of the trochar comes out in the centre of a large rubber sheet, and over that are placed sterile sponges or swabs. Periodically the sheet is opened out and the sponges replaced.

MR. SYDNEY SCOTT (in reply): In answer to Mr. Somerville Hastings, as mentioned in the note at the end of my case, it seems to me that the chief indication for draining the basal meninges through the labyrinth occurs when the meningitis is preceded by labyrinthitis, as is so frequently the case in otitic meningitis. When the patient is *in extremis* when first seen, I think it the right procedure whether one knows the labyrinth to be affected or not.

## Abstracts.

### BRONCHOSCOPY.

The Technique of Suspension in Bronchoscopy and Œsophogospy.—R. C. Lynch (New Orleans, La.). "The Laryngoscope," July, 1917, p. 533.

In children and infants Lynch has made use of his own suspension method and apparatus for introducing and manipulating bronchoscopic and œsophogopic tubes. Infants and young children are the most ideal subjects for suspension because of their muscular undevelopment, their flexible necks, and the short distance from the upper teeth to the larynx. It is in infants and young children that the greatest number of our foreign body cases occur, and it is in these also that we most fear reactive inflammation and swelling due to our manipulations. It is not uncommon for the surgeon to remove the foreign bodies successfully with the bronchoscope only to be called again to relieve the subglottic œdema by a tracheotomy. Peroral endoscopy is the procedure of election in infants and young children provided one has developed a technique which will

permit the passing of the tube through the glottis with the least amount of traumatism. Suspension aids this to the greatest degree. Lynch agrees with Jackson in his postulate: no anæsthesia in young children and never in infants. For bronchoscopy in infants and young children the head of the table is not dropped. Just sufficient extension by moving the horizontal crane outwards is made to bring the posterior two-thirds of the larynx into view; then the neck is straightened by the elevation of the travelling crane, and we have the posterior two-thirds of the larynx well in view, in many instances with the child's head hardly elevated from the table. The child is prepared by being wrapped firmly in a sheet, and the crane so adjusted that we may procure flexion of the head rather than extension. We do not want to see the anterior commissure. We only desire to gain sufficient room for the passage of the tube. Lynch prefers to introduce the suspension spatula so that it picks up the laryngeal face of the epiglottis and brings into view the interior of the larynx. Five per cent. cocaine is now applied to the upper part of the larynx only. The surface of the larynx and vocal cords are next covered with sterile vaseline to permit the easy passage of the tube. It is now an easy matter to slip the bronchoscope or œsophoscope into their respective openings without injuring the parts. Lynch preferred the Killian baby set of bronchoscopic tubes, because they are equipped with a hollow, smooth mandarin which causes no injury. Further, these tubes give the largest working lumen. The tube should be well greased, and the cords separated by a retractor. In this way the tube can be passed into the trachea without coming into contact with the subglottic space. Once the tube has passed the vocal cords the mandarin is removed. If it is probable that the tube will have to be removed and reintroduced, as in the case of multiple bodies, it is best to continue the patient in suspension.

If, on the other hand, one prefers to use the tube unaided after its passage through the cords, the hook of the suspension apparatus is removed from the crane and carefully tilted to the right to permit the removal of the left tooth plate; then the right tooth plate is removed in the same manner. The pear-shaped ring of Lynch's apparatus is now bent back upon its hinge, and the screw holding the spatula is loosened. In this way the body of the hook is disengaged from the spatula so that the latter can be finally removed. (It must be noted that Lynch's article applies only to his own apparatus for suspension, and that his technique is not suitable for the suspension laryngoscopy apparatus of Killian—the one usually employed in this country. In many ways Lynch's apparatus, as shown in his illustration, appears to be a great improvement on Killian's. It certainly appears to allow much more working space, and thus facilitates the passage through it of bronchoscopic or œsophogopic tubes.—Abstractor.)

*J. S. Fraser.*

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### EAR.

**Primary Carcinoma of the Middle Ear.** "Laryngoscope," July, 1917, p 543.

Newhart states that primary carcinoma of the middle ear is very rare. Cancer of the external meatus is much less rare, while malignant disease of the auricle is comparatively common. Up to 1910 less than 50 authenticated cases of middle-ear cancer had been recorded. Dupau



estimates that there is only 1 case of malignant disease of the middle ear in every 10,000 cases of otorrhœa. Newhart has received 247 replies from otologists in America on this subject; 192 had never had a case, while the remaining 45 returned a total of 51 cases. The disease occurs most frequently after the age of forty, but 4 cases are reported under twenty-one years. Chronic purulent otitis media was present in over 85 per cent., and many gave a history of suppuration dating from infancy or early childhood. Of all *symptoms*, the most constant and usually the earliest is pain referred to the meatus or the post-auricular region. Next in frequency is the presence of bleeding granulations in the middle ear or meatus. Facial paralysis occurs relatively early in most cases. Mastoid tenderness and swelling, with a superficial ulceration, appear in the advanced stages. The degree of deafness depends on the involvement of the cochlea. Vestibular symptoms are frequently very late. Cachexia is common, and is explained by disturbances due to the pain and the poison produced by the growth itself. Practically all the cases were squamous epitheliomata, but one notable exception, described by Lange, proved to be a cylindrical-celled cancer. Invasion of the bone takes place from the tympanum, and destruction goes on rapidly with the formation of irregular sequestra. The *labyrinth capsule is very resistant to the new growth*, and the dura also presents a decided barrier to its extension to the brain. Neighbouring lymph-glands are often enlarged, but microscopically show only an inflammatory reaction, and almost never reveal the presence of carcinoma. With the advance of the growth the parotid gland and lower jaw joint are invaded. The lateral sinus is not infrequently obliterated, and in advanced cases the meninges, brain, and cranial nerves are attacked. Metastases are very unusual.

*Prognosis.*—Carcinoma of the middle ear runs a rather rapid course. The interval from the first symptom to the time of death varies from eight to eighteen months, with one year as the average duration. Death is caused by meningitis, brain abscess, hæmorrhage, or exhaustion, or by the direct extension of the growth to the vital centres. An early *diagnosis* can only be made with the microscope. Newhart recommends that aural polypi, especially in persons over forty years of age, should be microscopically examined. The only effective *treatment* consists in thorough operation, though some writers advise against all interference. Operation at least results in relief of pain, even if the relief be only temporary. Newhart has been unable to find any positively successful result from the use of radium or the X-rays. His own case was that of a female, aged sixty-five, who complained of severe pain in the right ear, with foul discharge and occasional bleeding of five months' duration. The trouble began with an attack of influenza. The conversation voice could be heard at 10 ft., with the noise apparatus in the healthy ear. (The patient suffered from arterio-sclerosis and chronic nephritis.) Just before operation facial paralysis was observed. X-ray examination revealed extensive destruction of the bone. On cutting through the periosteum the knife plunged deeply into the mastoid, which was filled with very vascular granulations, interspersed with small sequestra. As the dura was found to be involved, no attempt was made to extirpate the growth. As a result of operation, the pain disappeared and also the facial paresis. The wound healed rapidly. Owing to recurrence of pain, a second operation was performed ten weeks after the first, and again there was some relief from pain. Later there was a severe spontaneous hæmorrhage from the ear, checked by packing. Morphine soon became

necessary. Death occurred eight months after the onset of the first symptom. The *post-mortem* showed that the maxilla and the parotid gland were involved. *J. S. Fraser.*

**Wounds of External Auditory Meatus.**—*J. Rozier.* “*Rev. de Laryng., d’Otol., et de Rhinol.*,” August 31, 1917.

This monograph (a continuation of the paper in the August 15 number) deals with traumatic stenoses. Of fifty cases in Prof. Moure’s clinic, seven are described in detail. To these a case of *congenital* bony atresia, to indicate that, whether traumatic or congenital, the condition presents similar problems. The stenoses were of the mixed annular and tubular types; in two cases they involved the bony as well as the cartilaginous meatus, the other five being simply cartilaginous.

To enlarge the bony canal, cutting operations were limited, as would be expected, to the posterior and superior walls. As regards the concha and cartilaginous meatus, these were enlarged by flap operations as in a radical mastoid.

In three of the seven patients there was a recurrence. A study of the case-histories suggests to the reader no reason for these recurrences, nor does the author throw any light on this question, except that in all these three cases the anterior meatal wall had been injured.

None of the cases had as yet been observed for more than seven months since operation, and in view of the obstinacy of such stenoses, this period might be considered insufficient to justify a claim of permanent cure.

All will endorse the author’s belief in the paramount importance of post-operative treatment to prevent recurrence. *H. Lawson Whale.*

**Notes on War Injuries of the Ear.**—*R. E. Shuter.* “*Medical Journal of Australia*,” September 29, 1917.

Shuter, as consulting-surgeon to the Australian Imperial Force, made a fairly complete examination of more than 300 cases of war injuries of the ear. He gave, in addition, a considerable number of cases in which the examination was not complete enough to base upon it authoritative conclusions.

Whatever may be our opinions regarding his theory of the nature of concussion deafness, which he elaborates later in his thesis, we will all agree with what he says of certain ear conditions, which render a man unfit for active service. He says, “experience has shown that it is an economic mistake to pass men for active service, who suffer from discharging ears, or destruction of the drum membrane. Under the stress of camp and trench life even cases that have been long quiescent become active. The man is useless as a soldier, and becomes an encumbrance on the Medical Department, and occupies beds more urgently required.

The internal ear may be injured by direct traumatism, or by concussion. Concussion deafness is not due to the impact of sound waves, but it is due to dynamic waves. The bursting of a high explosive causes a sudden violent blast of wind especially in a confined space. The unilateral nature of concussion deafness excludes a central cause. Shuter “strongly suspects” that the middle ear, by which he means the sound-conducting apparatus of the ear, embracing the perilymph and endolymph of the internal ear, is the part wholly affected in

concussion deafness. Whatever value we may place on his theories, the direct observations of the writer are of value at the present time, and those interested will desire to read the paper *in extenso*.

A. J. Brady.

### MISCELLANEOUS.

**The Treatment of Bronchial Asthma by Vaccination, with Report of Cases.**—M. H. Licard (New York). "Amer. Journ. Med. Sci.," July, 1917.

Although asthma is undoubtedly in some cases an expression of anaphylaxis, a large number are obviously due to an infecting agent, and in these it is associated with bronchitis, and often runs an acute course with pyrexia, cough, and expectoration. The bacteria present are usually the *Streptococcus viridans* or *Streptococcus hæmolyticus*. Of the 16 cases treated by the author with autogenous vaccines, 12 were cured, 3 were improved, and 1, in which tuberculosis was also present, unimproved. Twelve cases required nine to sixteen injections, extending over a period of from four to eleven weeks. Two cases were given treatment for fifteen and seventeen weeks respectively.

Thomas Guthrie.

### NOTES AND QUERIES.

On Thursday, June 20, at the College of Ambulance, No. 3, Vere Street, Mr. Herbert Tilley gave a lecture on "First Aid in Diseases and Injuries of the Ear, Throat and Nose." The meeting was presided over by Sir Thomas Barlow, Bt. The lecture was illustrated by diagrams, models, stereograms, and lantern-slides. Only the general principles underlying the treatment of injuries, accidents, and diseases in these regions were dealt with, and emphasis was laid on the significance of earache, especially in children, the dangers of a chronic discharge from the ear, and the clinical significance of sore throat with pyrexia in children from the point of view of the infectious disorders of childhood. The audience was much interested in the demonstration of direct vision instruments and in the lecturer's collection of foreign bodies which is not unknown to our Section.

Some idea of the success of Mr. Tilley's lecture may be gathered from the fact that he was asked to repeat it, and on Thursday evening, July 28, he was welcomed by an equally enthusiastic audience.

### BOOK RECEIVED.

**Transactions of the Thirty-ninth Annual Meeting of the American Laryngological Association, 1917.** (From Dr. Harmon Smith, Hon. Secretary.)

THE  
JOURNAL OF LARYNGOLOGY,  
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**PULMONARY COLLAPSE, CONSEQUENT ON PAPILLOMATA  
OF THE LARYNX; UNRELIEVED BY TRACHEOTOMY;  
DEATH.**

BY C. H. MCILRAITH, M.D.,

Acting Assistant Surgeon in the Throat Department, King's College Hospital.

(From the Clinic of Sir StClair Thomson.)

*Clinical History.*—A female child, aged twenty-two months, was admitted to hospital suffering from aphonia and difficulty in breathing. The aphonia had been present for some months, and the difficulty in breathing had increased during the previous fourteen days. The breathing was markedly stridorous, both on inspiration and expiration, and expiration was somewhat prolonged. The child's temperature was normal. On examination there was noticed marked indrawing of the lower ribs. Percussion of the chest gave equal resonance on both sides, no dulness being elicited. Coarse *râles* were present all over the chest front and back, both on inspiration and expiration, completely obscuring any vesicular murmur. Indirect laryngoscopic examination revealed a large mass of papillomata of the larynx. By direct laryngoscopy this was found almost completely blocking up the lumen of the larynx and projecting into the fold of the epiglottis. Under chloroform this mass was removed by direct laryngoscopy, disclosing some more papillomata of the right vocal cord anteriorly and also a large, more or less round mass attached to, and apparently extending below, the left vocal cord. A moderate airway seemed to be re-established, and it was hoped that the child would be temporarily relieved. As no relief followed, and the breathing was getting worse, tracheotomy was performed twenty-four hours later. This also failed to give any relief, the breathing gradually became more and more difficult, and, although the inspiratory effort was considerable, little air appeared to enter the lungs. Expiration, however, seemed fairly easy. The child was not very restless but was evidently much distressed. The face was distinctly livid, especially about the eyelids, nose, and mouth. There was scarcely any



attempt at coughing, and the passage of a feather through the tracheotomy tube failed to produce a reflex. The child was kept quiet and hot applications made to the chest. The features, however, became more and more pinched and the eyes dull and hollow. The subcutaneous tissues of the neck and chest became swollen and emphysematous. The muscles of respiration appeared to act very forcibly and jerkily. Inspiration became less and less as the child gradually sank, death taking place eighteen hours after the tracheotomy.

*Autopsy.*—Well-nourished child. Slight cyanosis of face and hands; much emphysema of chest and flanks, more marked on the right side. Emphysema of the mediastinum and round the roots of the lungs. The lungs were completely collapsed, cut portions sinking in water. Heart normal. Tracheotomy wound, however, was in good position, in the mid-line of trachea, through the fifth, sixth, and seventh rings, and the lumen of trachea was quite clear. Bronchi were not obstructed. There were papillomatous growths in the larynx, covering almost the entire left vocal cord and forming a globular mass anteriorly. Two-thirds of right vocal cord were also invaded by papillomata. The scar left by removal of portion of growth was visible in the anterior commissure.

*Pathology.*—Some years ago the late Sir William Gairdner, of Glasgow,<sup>1</sup> put forward the theory and explained the mechanism by which the collapse of the lobules of the lung is affected. He suggested that in the act of inspiration a plug of mucus is carried onwards and inwards along the bronchial tubes, the calibre of which progressively lessens in size. Thus, the plug ultimately obstructs the tube so that no more air can enter, but yet expiratory efforts can force air outwards past the obstructing plug. An air-pump condition is set up by which the lobules of the lung are gradually exhausted of air, and, in consequence, collapse takes place.

This is the view held more recently by Hewlett ("Pathology, General and Special," 1912). He says: "Collapse is a condition in which the air is gradually or completely driven out of portions of the lungs. It occurs from pneumothorax, air, or gas in the pleural sac, fluid in the pleural sac, and bronchial obstruction, e.g. by viscid mucus. This acts as a ball valve, air escapes during expiration, but during inspiration the plug is driven inwards and prevents inflation of the area supplied by the bronchus."

In Adami and Nicholls ("Principles of Pathology," 1909), it is stated, under the heading "Atelectasis": "Causes of the acquired form may be included under the general heads of (1) Defective respiratory function within the lung itself, and (2) external mechanical pressure of the first type, the commonest form is that found in cachectic or moribund individuals. Owing to weak inspiratory movements and the accumulation of fluid in the air passages, the lung tissue is not perfectly distended; consequently small areas, chiefly at the margins of the lungs, become partially or wholly collapsed. Another form is that where the bronchial tree in some portion becomes occluded (obstructive atelectasis) as from a foreign body, the accumulation of secretions in the lumen, and intra-bronchial and intra-pulmonary tumours. The collapse in these cases is brought about in part by the obstructing material acting as a kind of valve, whereby air does not readily enter the affected portion while it passes freely out. This mechanical action is, however, not entirely adequate to explain the condition, for the whole of the contained air would not be got rid of in that way. The residual air is absorbed into the blood (absorption atelectasis) and the collapse becomes complete."

(2) Of the second type, but having no bearing on the present case, he says: "External pressure upon the whole lung or any part of it is a very frequent cause of atelectasis (compression atelectasis). Pressure may be exerted by fluid or air within the pleural cavity, an elevated diaphragm, aneurysm, or tumours in

<sup>1</sup> Gairdner on "Bronchitis," 1850.

the mediastinum, kyphosis, and scoliosis of the vertebral column, enlargement of the heart or pericardial cavity, and thickening and contraction of the pleura."

Coplin ("Manual of Pathology") states: "Acquired atelectasis or collapse is the condition observed when a part of the lung which has once expanded loses its air and does not refill. Bronchial obstruction is a frequent cause; the occlusion may be due to a foreign body, a mass of false membrane, a clot of blood or a plug of mucus. The bronchus may be collapsed by pressure from without. No attempt is made to explain the mechanism by which the collapse is produced."

On the other hand, that collapse is caused by the absorption of the air from the lung into the blood is the view put forward by Lazarus-Barlow ("General or Experimental Pathology," 1904). He states: "The conditions leading to collapse of the lung are essentially two: (1) Pressure on the alveoli from without; (2) obstruction to bronchi. For a long time collapse of the lung was explained by aid of a theory formulated by Gairdner, and known as 'the ball-valve theory.' This theory is now of historical interest only. At the present time it is generally accepted that collapse is produced because the air formerly contained in the alveoli communicating with the obstructed bronchus has been removed by the blood." He also states that: "This was conclusively proved by Lichtheim twenty-five years ago. He completely obstructed bronchi in rabbits, and found that a typical collapse was produced in that portion of lung supplied by the occluded bronchus."

*Remarks.*—The present case is unique—firstly, because of the extent of the atelectasis, both lungs being completely collapsed; and, secondly, because it strongly confirms the ball-valve theory. The growth in the larynx was the ball-valve, inspiration drawing it more or less completely into the chink of the glottis, while expiration was fairly free. Collapse of the lung—partially, at any rate—must have already taken place before the tracheotomy was performed, and as the natural resiliency of the air-cells had thus been impaired, the removal of a portion of the growth and the subsequent tracheotomy failed to give sufficient relief. In addition, as the over-action of the chest muscles and diaphragm failed to overcome the collapse of the air-cells, the negative pressure would, by suction action, tend to draw air from the tracheotomy wound into the tissues. The negative pressure inside the pleural cavities, with the lungs collapsed, would further tend to increase this emphysema; moreover, the same causes would promote the absorption of the residual air from the partially collapsed lungs.

*Remarks by Sir StClair Thomson.*—I examined this little patient in my clinic, and was impressed by the way in which a child of less than two years of age had been taught to lend herself to indirect laryngoscopy. She should, of course, have been brought to the clinic much sooner, but, as so often happens when dyspnoea and stridor come on gradually, the parents were not struck by any urgency in the symptoms. When they did bring her, it was evident that immediate operation was called for. I was not present at either of the operations, but examined the parts from the *post-mortem*. There was no traumatism in the larynx resulting from the removal of the papillomata, and the tracheotomy had been most skilfully and correctly performed—low in the trachea and exactly in the middle line.

Apart from the general interest of the case and the explanation of it given by Dr. McIlraith, we have in it further evidence in support of the plea I have so often advanced for early tracheotomies. In gradually advancing stenosis of the larynx or trachea the patient adapts himself so readily to his reduced ration of tidal air that there is often no evidence of air hunger, and the fact that he is starving from respiratory famine does not obtrude itself on himself, his friends, or his medical attendant. Yet, as soon as the stridor is perceptible—when the patient

is at rest or asleep—and if the stenosis is due to a cause which is likely to be progressive, a tracheotomy should be performed without delay. There can be no objection to this operation—a safe and not a difficult one if performed in good time and without the “wild excursions and alarms” which are apt to accompany it when unduly delayed. The only instance in which there is any possible objection is in the case of young females of the leisured class, who, naturally enough, would desire to avoid any scar in the neck. But such cases are very rare.

If the indications for a prompt tracheotomy are neglected, the operation may, when performed, completely fail in its effect, even although carried out *secundem artem* and with immediate restoration of a wide and free air-way. How often do we read in clinical records that “tracheotomy was performed, but the patient died a few hours (or days) afterwards”? This failure is not due, in most cases, to any defect in the operation. It is generally the result of the stealthily augmented air starvation and the consequent back-pressure on the heart. Such patients are saved from suffocation, but not in time to protect them from cardiac failure. And Dr. McIlraith's well-observed case shows, in addition, that death in children may still occur from respiratory failure, even after restoration of a free air-way.

We seldom have to regret the performance of an unnecessary tracheotomy. It is better to do several too soon than one too late. Many patients have been lost from want of a timely tracheotomy; very few die from the operation, and nearly all of these are because “delays have dangerous ends.”

## INTRINSIC CANCER OF THE LARYNX AND THE OPERATION OF LARYNGO-FISSURE,

WITH A DESCRIPTION OF SOME NEW INSTRUMENTS SPECIALLY DESIGNED FOR IMPROVING THE TECHNIQUE.

By IRWIN MOORE, M.B., C.M. EDIN.

(Continued from p. 242.)

### SUBPERICHONDRIAL RESECTION OF THE GROWTH.

A perichondrial elevator (Fig. 24) is first inserted under the perichondrium at the cut edge of the thyroid cartilage (Fig. 25), and the soft parts, together with the perichondrium, are raised off the inner surface of the thyroid cartilage, as is done in the parallel operation of subperichondrial resection of the nasal septum, the instrument being worked upwards, downwards, and backwards, until one can get no further, as far as the vocal process of the arytenoid, leaving the inner surface of the thyroid cartilage bare. As the cartilages are usually ossified in these cases, periosteal rather than perichondrial resection would, perhaps, be the more correct description. This procedure—*i. e.* the removal of the soft parts along with the perichondrium—first suggested by Solis-Cohen<sup>1</sup> as a safeguard against possible deep infiltration and involvement of the perichondrium, was a marked advance on the older method of removing the growth along with the soft parts whilst leaving the perichondrium intact. Having completed the separation from the thyroid cartilage, the growth, including, at least,  $\frac{1}{4}$  in. of surrounding healthy tissue, is

<sup>1</sup> *Laryngoscope*, 1907, xvii, p. 367.

clipped round with scissors, first below, then above (Fig. 26), and then round at the back, including the vocal process of the arytenoid (Fig. 27), or, if necessary, to be certain of getting a wide margin of tissue free from



FIG. 24.—Perichondrial elevator.  $\frac{2}{3}$  scale.

the disease, a large part of the arytenoid itself may have to be removed. The first incision should always be made below the growth (Fig. 26), in order that if much bleeding occurs it will not obscure the second semi-circular cut, otherwise the operator will be prevented from judging the

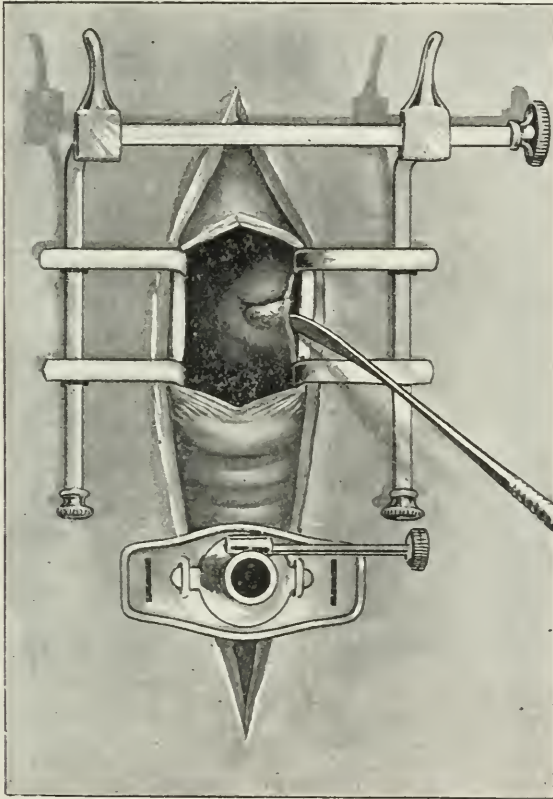


FIG. 25.—View of open larynx showing elevator being inserted under the perichondrium at the cut edge of the cartilage—in the first stage of removal of the growth.

amount of healthy tissue round the growth which it is necessary to remove. The advantage of this method is that the growth can be removed *en masse* in one piece untouched by any instrument, looking like a miniature mass of flesh upon a fleshy plate (Solis Cohen)<sup>1</sup> (see Fig. 29).

<sup>1</sup> *Ibid.*, p. 367.



*Intra-laryngeal Scissors* (Fig. 30).—(a) Straight blades; (b) straight blades with angular shafts; (c) blades curved at right angles; and (d) blades curved on the flat. These have been made with small yet very strong blades, and long shafts which are strengthened to prevent strain and consequent weakness in the cutting blades. After the perichondrium with the soft parts have been raised from the inner wall of the larynx by the periosteal elevator these scissors are of great service, for they can be easily manipulated inside the laryngeal cavity without interfering with

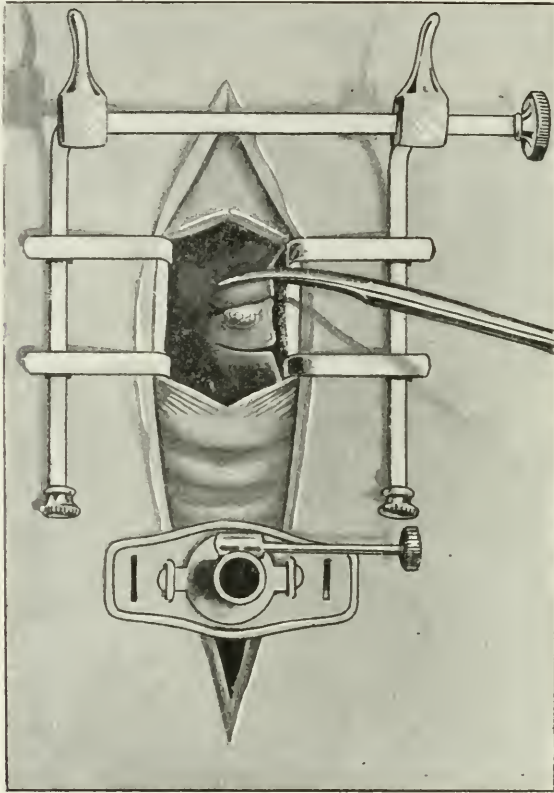


FIG. 26.—View of open larynx—the perichondrium along with the soft parts have been separated from off the inner surface of the thyroid cartilage by the elevator. The lower crescentic incision made by the scissors is seen, whilst the upper incision has just been completed.

the view; consequently, the entire cutting away and removal of the growth may be performed under direct vision. The straight scissors or those curved on the flat are used in making the upper and lower incision—*i. e.* above and below the growth—from before backwards. The rectangular scissors are used to separate the mass posteriorly from the ary-tænoid cartilage.

If the growth has extended to the anterior part of the opposite cord, a portion of this must be removed or the entire cord may have to be sacrificed. If only the vocal process is divided, no disturbance results; but if

the greater part of the arytaenoid has to be removed, interference with swallowing of food and mucus will follow. Dundas Grant<sup>1</sup> refers to the importance of preserving, if possible, the attachments of the sphincter laryngis, for its presence diminishes regurgitation of liquids during drinking.

Dan McKenzie<sup>2</sup> mentions a case in which he performed thyro-fissure, and where it was necessary to carry the removal of the growth well into the arytaenoid region. As a result, swallowing was interfered with, and

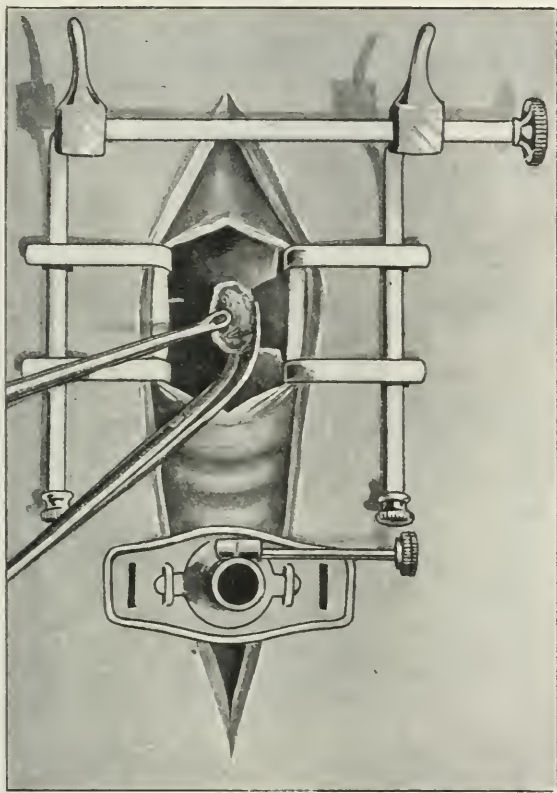


FIG. 27.—View of open larynx—showing separation of the mass from the arytaenoid cartilage by means of the rectangular scissors, whilst the growth is seen along with its accompanying perichondrium securely held by the non-crushing forceps.

the food came through the tracheotomy tube. The patient developed pneumonia, which proved fatal.

StClair Thomson<sup>3</sup> refers to a case where the invasion of the arytaenoid region involved extensive removal of the arytaenoid end of the cord, and this was followed by some cicatricial contraction and slight glottic stenosis with some dyspnoea on exertion. He remarks that saving the patient's life is of more importance than the question of slight stenosis.

<sup>1</sup> "Proc. Roy. Soc. Med.," 1915, viii (Laryngol. Sect.), p. 37.

<sup>2</sup> *Ibid.*, p. 36.

<sup>3</sup> *Ibid.*, 1917, xi (Laryngol. Sect.), p. 14.

Some operators make a deep elliptical incision round the growth by means of a knife, right down to and including the perichondrium, the incision being made first behind, from the extremities of which incisions are brought forward above and below the growth. The perichondrium is then raised with a dissector at the most accessible point, and, finally, the mass is removed intact with a pair of scissors. In growths which are situated some distance from the anterior commissure Solis Cohen<sup>1</sup> adopts



FIG. 28.—Epithelioma of the larynx in a patient, aged seventy. Laryngoscopic view of the growth, apparently only involving the anterior half of the left vocal cord.

this method, whereas if the growth is anterior or near the commissure he advocates elevation of the perichondrium from the cut edge of the thyroid cartilage (as previously stated).

*Intra-laryngeal Forceps* (Fig. 31).—These are especially useful for grasping the growth, or, more correctly, the healthy surrounding margin



FIG. 29.—Life-size drawing of growth removed *en masse* by thyro-fissure, together with the perichondrium and soft parts, from the larynx shown in Fig. 28. The margin of healthy tissue around the growth is well seen, also the cut surface of the vocal process of the left arytenoid in the upper left-hand corner. On comparing the specimen with the laryngoscopic view, it will be seen that the latter shows but a small portion of the actual growth, which has extended into the sub-glottic region.

(Drawn immediately after removal.)

of the growth, during its removal with the scissors. They are made with smooth circular unserrated ends which prevent tearing into or crushing the growth, such as may occur with ordinary dissection or tenaculum forceps, and consequently the risk of reinfected the wound by cell transplantation is avoided. The importance of avoiding this reinfected has been referred to by many writers. Lack,<sup>2</sup> amongst others, has discussed this matter.

<sup>1</sup> *Laryngoscope*, 1907, xvii, p. 367.

<sup>2</sup> *The Lancet*, 1896, vol. i, p. 1638.

Charles Ryall,<sup>1</sup> referring to the risk of the surgeon reinfesting his patient by incising or lacerating the growth during operation, so causing the escape of cancer cells and infection of the wound, says: "Cancer implantation as a causation of cancer recurrence is, in my opinion, insufficiently recognised at the present time. It is of comparatively frequent occurrence, and is a real and exceedingly grave danger."

Crile<sup>2</sup> advises that to avoid reimplantation of cancer cells no instrument or sponge that has touched the cancer surface should be used again, nor should they touch anything else that may be used again in the operation. These forceps may also be used for inserting the tethered sponge or gauze into the trachea after the larynx has been opened. They

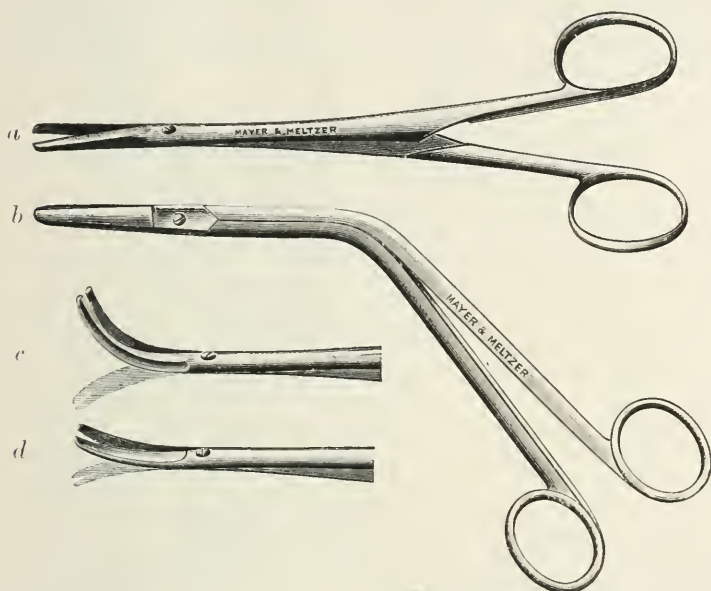


FIG. 30.—Intra-laryngeal scissors. (a) Straight blades. (b) Straight blades with angular shafts. (c) Blades curved at right angles. (d) Blades curved on the flat.  $\frac{1}{2}$  scale.

are made either straight or angular (Fig. 31) to suit the convenience of operators.

Since Butlin<sup>3</sup> and Semon were largely responsible for the revival of this operation in this country, and for certain modifications in the after-treatment which rendered it less fatal than formerly, it is interesting to note the manner in which they operated:

The skin incision extended from the hyoid bone almost to the sternum, and the structures were divided right down to the thyroid cartilage and trachea, including generally the isthmus of the thyroid gland. The vessels, mainly veins, were clamped. The trachea was

<sup>1</sup> "Cancer Infection and Cancer Recurrence: a Danger to Avoid in Cancer Operations," *Lancet*, 1907, ii, p. 131.

<sup>2</sup> "Operative Surgery of the Nose, Throat, and Ear," by Hanau W. Loeb Review in *JOURN. OF LARYNGOL. RHINOL., AND OTOL.*, 1915, vol. xxx, p. 511.

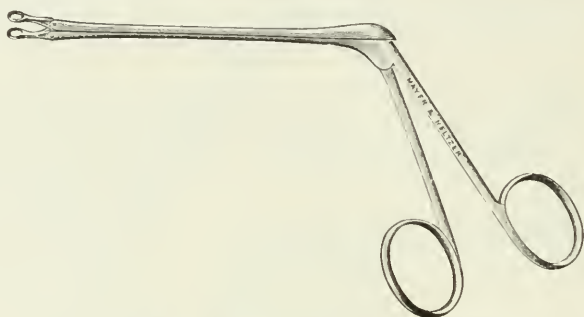
<sup>3</sup> "The Operative Surgery of Malignant Diseases," 1900, p. 191.



freely opened below the cricoid cartilage and Hahn's tube with its sponge covering introduced; ten or twelve minutes then elapsed before the trachea was opened to allow the swelling of the sponge to completely occlude the trachea and thus prevent blood and secretions entering the air-passages. The thyroid cartilage was then split, and the two alæ were held widely apart by means of silk threads passed through each and the interior of the larynx was brushed out with a 20 per cent. solution of cocaine. An incision was carried around the growth with knife or scissors. The included area was cut out right down to the cartilage, which was laid bare and scraped with a Volkmann's spoon. The cavity was then plugged with iodoform gauze for two or three minutes. The gauze was then removed and the surface dusted with powdered iodoform. The thyroid alæ were brought together with a couple of silk or silver sutures, the Hahn's tube was removed immediately after the operation, and in their later cases no other tube employed in its place, the edges of



Straight intra-laryngeal forceps.  $\frac{1}{2}$  scale.



Angular intra-laryngeal forceps.  $\frac{1}{2}$  scale.

FIG. 31.—Non-crushing forceps for holding the edge of the growth.  
(a) Straight. (b) Angular.

the wound in the soft parts were brought together, except at the lower part, where the tube had been inserted.

Butlin and Semon in their earlier cases were in the habit of using Hahn's tube during the operation and replacing it after operation by an ordinary tracheotomy tube, which was left in for a few days.

During recent years Hahn's and other sponge-covered cannulae have been dispensed with by most operators, for it was found that the surrounding sponge required ten or more minutes before it became swollen sufficiently to occlude the trachea from the entrance of blood, and frequently the sponge never expanded at all. Apart from this risk it supplied a septic focus which was sufficient to condemn it.

StClair Thomson<sup>1</sup> last used Hahn's tube in 1906, and says that the only case of pneumonia he had in his cases up to that date was an earlier case where he used Hahn's tube.

Some operators, *e. g.* Chiari,<sup>2</sup> Kocher, etc., still use a tampon-cannula, which is replaced at the end of the operation by an ordinary cannula, a

<sup>1</sup> *Brit. Med. Journ.*, 1912, i, p. 359.

<sup>2</sup> "Trans. Amer. Laryngol., Rhinol., and Otol. Soc.," 1909, p. 16.

tampon being placed and left in the larynx for three to eight days so as to prevent the entrance of blood, wound secretions, and saliva into the trachea during the first few days after the operation. By this means they maintain any risk of secondary hæmorrhage is prevented, and no special post-operative position for the patient is required.

In the removal of the growth a considerable amount of bleeding may occur, which can easily be controlled by gauze pressure—dry adrenaline gauze being the best for this purpose—but if there is a bleeding point artery forceps may be necessary.

Butlin<sup>1</sup> says he has never seen bleeding which could occasion the least anxiety.

Persistent oozing frequently occurs during separation of the muscular

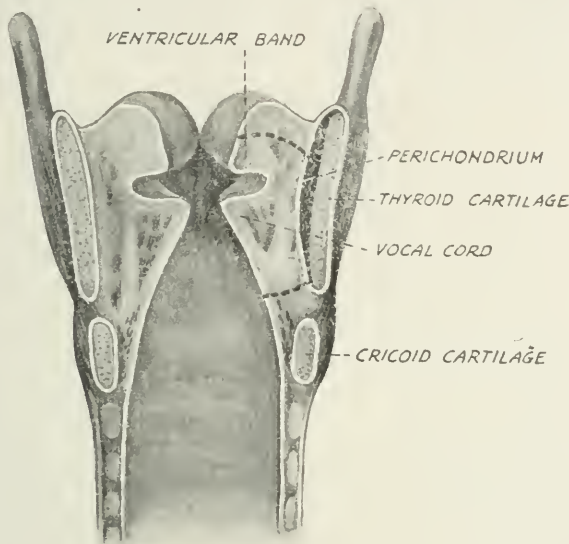


FIG. 32.—The subglottic region. Coronal section of the larynx, seen from the front. Dotted line shows the extent of tissue removed when the growth is confined to the vocal cord or ventricular band. On the left side the perichondrium has been raised, together with the soft parts from the inner surface of the thyroid cartilage, and the absence of continuity between the perichondrium of the thyroid and cricoid cartilages is well seen, thus illustrating the difficulties of separating between the thyroid and cricoid cartilages in subglottic extension of the growth.

attachment round the arytenoid, and a small vessel may be found between the arytenoid and lateral wall of the thyroid cartilage, which occasionally spurts and gives trouble. It should be pinched with pressure forceps, and may perhaps require ligaturing. For bleeding in the larynx, the cautery is advised by some American writers; but it has been shown that the voice is not so good afterwards, and is only mentioned here to be condemned. Laceration, the result of rough operation, or cauterisation of the laryngeal tissues, may be followed by extensive inflammatory reaction and narrowing of the air-way.

If the disease has extended into the subglottic region, it is difficult to remove it from the inner surface of the cricoid plate, because here the

<sup>1</sup> Butlin, *op. cit.*, p. 191.

perichondrium is more firmly adherent, and there is a break in the continuity of the perichondrium of the thyroid and cricoid cartilages. It is especially difficult to get beyond the growth in those cases where the growth has extended in between the thyroid and cricoid cartilages, and infiltrated the muscles in this position (Fig. 32). These subglottic extension cases are the more serious ones because recurrences are more apt to occur in them. In such cases, where the removal of much tissue or division of the cricoid cartilage is necessary to reach the growth, stenosis is likely to occur.

As a rule, it is not necessary to remove the cartilage of the thyroid alæ, as Butlin<sup>1</sup> has shown that it is only involved very late in such cases, but if the growth is found to be more extensive, and the cartilage underlying it is affected, then it may be removed. Involvement and perichondritis of the thyroid cartilage may only be revealed at operation, and extensive disease has been occasionally found to exist in the endo-larynx without any visible extrinsic development. When the growth has extended beyond the limits recommended for classical thyro-fissure, a hemi-laryngectomy or a laryngectomy must be performed.

*Microscopical examination of the growth removed* should show ample, healthy tissue all round. Three sections at least should be cut, one through the middle, one beyond the anterior edge of the growth, and one posteriorly at the level of separation through the vocal process. Sections of any other pieces of suspected tissue removed after the main growth should also be examined. It is advisable also to examine the gland from the anterior surface of the crico-thyroid membrane. While it is sometimes difficult to determine the limits of the disease, the microscope will show infiltration in the areas which to the naked eye may have appeared normal, or when an insufficient area of healthy tissue has been removed around the growth. The complete and satisfactory removal of a growth may be concluded from the pathologist's report if the investigation has been thoroughly carried out.

*Closure of Larynx and Wound.*—After the removal of the growth care must be taken not to close the wound until all bleeding has ceased, and, if possible, the inside of the larynx has become dry and glazed. When the retractor is removed the two halves of the larynx generally come together and readjust themselves, and only require sutures inserted through the soft tissue at the sides of the thyroid cartilage in order to steady and keep the two halves in position until fibrous union has taken place. The drawing together of the separated muscles by deep (buried) sutures is sufficient to steady and keep the thyroid alæ approximated. If the thyroid alæ do not come together, and there is a tendency to override, catgut sutures should be passed through the perichondrium covering the thyroid cartilage, and the two halves drawn accurately together. The sutures should not pass through the cartilage itself, since it has been found that they encourage the formation of granulation tissue.

Formerly, the lower part of the wound was kept open by means of a drainage tube to avoid the possibility of retention of septic material; but, nowadays, the external parts are always brought together by sutures passed through the skin, with the exception of the portion corresponding to the tracheal opening which is left open to favour, if necessary, expulsion of discharge from the wound or air-passages, and to permit the reintroduction of a tracheotomy tube should the necessity arise.

<sup>1</sup> *Op. cit.*, p. 191.

Butlin<sup>1</sup> says: "I think it is much safer to leave this part open in order to provide for the ready escape of blood and other liquids from the larynx and trachea, and to guard against cellular infiltration underneath the skin. In order to hasten the convalescence, some operators have lately closed the entire wound; but I am very much opposed to such a practise which aims only at shortening what is really a very short after-treatment, and does so with decided risk to the patient."

Semon, in his earlier operations, closed the entire wound immediately after operation and left a tracheotomy tube in position, but later he was accustomed to close only the upper part and leave the lower part open for two or three days until all danger of septic complications had passed.

The wound rapidly heals by first intention with the exception of the tracheotomy wound, which is only a few days later in closing.

Solis Cohen's<sup>2</sup> suggestion, therefore, of making two incisions so as to leave a bridge of tissue between the thyro-fissure and tracheotomy wounds, on the grounds of more rapid healing, is quite unnecessary.

(To be continued.)

## CLINICAL NOTES.

### MALARIA OCCURRING IMMEDIATELY AFTER OPERATION FOR ACUTE MASTOIDITIS

BY NEIL MACLAY, M.B., C.M.,

Hon. Surgeon, Newcastle Throat and Ear Hospital; Surgeon, Northumberland War Hospital.

LCE-CORPL. F— was admitted to Northumberland War Hospital on April 24, 1918, suffering from a shell wound in the upper third of his right thigh, from which a large F.B. had been removed in France. On the 29th—that is, four days after admission—he complained of pain in his right ear, and admitted having had some pain in the ear from the time he was involved in the shell explosion which caused his thigh injury.

There was no mention of any ear symptoms or signs on his field card, and he himself had not noticed any kind of discharge from the right ear.

Examination revealed a posterior inferior oval perforation in the tympanic membrane and a small amount of serous discharge, but no pulsation, and only slight evidence of inflammatory reaction in the upper part of drum. The external meatal canal was cleaned out with spirit and a wool plug introduced.

May 3, 1918.—Thigh wounds were excised, "bipped," and sutured.

May 10, 1918.—Patient complained of increased pain in the ear, and the nurse noticed aural discharge. The mastoid area was now tender to the touch, but there was no oedema or redness. There was a good deal of muco-purulent discharge in the meatal canal, and, on inspection, there was some pulsation seen at the perforation. Temperature was 99° F.

May 15, 1918.—Headache and increased tenderness, particularly over the site of mastoid antrum. Temperature 100° F. X-ray examination revealed cloudy opacity throughout the entire mastoid cell area on right side, and this showed up in strong contrast with clearly-defined cell area on the left side.

May 17, 1918.—Cortical mastoid operation performed. Cell area filled with inflammatory tissue—rarefaction of bone—no visible pus. Cleaned out with spoon and burr. Middle ear left intact, also posterior meatal wall; cavity packed with bipped gauze and two sutures introduced.

May 18, 1918.—Temperature normal; headache and earache better.

<sup>1</sup> Butlin, *op. cit.*, 1900, 2nd edit., p. 191.

<sup>2</sup> *Laryngoscope*, 1907, xvii, p. 366.



May 19, 1918.—During the afternoon patient had a sharp rigor, and temperature rose to 105° F.

May 20, 1918.—Temperature normal and feeling comfortable. Wound dressed, and looked clean and satisfactory in all respects. No tenderness in neck or any gland enlargement in carotid triangle.

May 21, 1918.—Rigor occurred about 2.30 p.m., and temperature rose to 105° F.

May 22, 1918.—Temperature and pulse normal. No signs of intracranial complications. Patient says he has never had malaria and has never been in a malarious district. There is no evidence of splenic enlargement. He looks anæmic.

May 23, 1918.—Rigor in early afternoon; temperature rose to 103° F. No change in physical signs. On questioning, patient admits having been bitten by mosquitoes while in France.

May 24, 1918.—Blood films show malarial parasites. Temperature and pulse normal.

May 25, 1918. Rigor at mid-day. Temperature 105° F. Quinine sulph., gr. v, with acid sulph. dil., prescribed every four hours.

June 7, 1918.—There has been no further rise of temperature, and patient is looking well and feeling well.

The advent of a rigor in association with any suppurative disease in the middle-ear cleft suggests the onset of an intracranial complication which calls for immediate attention. In the present case, the extent to which the mastoid was implicated by the pyogenic disease—the presence of healthy bone covering the sigmoid groove and bulb—the severity of the rigors, the apparently complete recovery on the following days and the absence of other signs of intracranial mischief—caused one to consider the possibility of some other explanation of the acute constitutional disturbance. At the same time the absence of a malarial history and the fact that the patient had not at any time lived in a malarial country were somewhat disconcerting, and added to one's feeling of uncertainty about the diagnosis. I am afraid we were, perhaps, too much taken up with the endemic nature of malaria, and inclined thus to overlook the fact that it is a disease which may be acquired wherever the infected mosquito exists.

The onset of malaria in association with trauma and surgical operations is such a common experience in endemic areas that one wonders why, in the present case, the symptoms were delayed till after the performance of the third operation.

I am indebted to Col. G. G. Adams for permission to publish the notes of this case.

## POST-CRICOID SPASMODIC STRICTURE.

By DAN MCKENZIE.

Two cases lately under my care have afforded an opportunity of seeing a spasmodic stricture of the pharyngo-œsophageal orifice behind the cricoid cartilage.

Both patients were women; their symptoms were similar and the appearances almost identical.

CASE 1.—Hospital patient; female, aged forty-five. Ever since childhood the patient had been subject to difficulty in swallowing, and for ten years the obstruction had been so great and so constant that she had not been able during that period to sit through a meal. No matter how carefully she chewed the food and how cautiously she proceeded to swallow it, at some time or another during the meal the food became absolutely arrested, and she had to retire from the table and empty her throat by a regurgitant effort. Then she began again, and so by perseverance and continual effort she contrived to get

enough food down to keep her alive. But so objectionable did she feel this behaviour to be that never once during those ten years had she eaten a single meal outside of her own house.

An X-ray examination with the screen was made by Dr. Ironside Bruce, and he reported that the bismuth meal was arrested at the level of the cricoid. There was no indication of pouching and a photograph was not taken.

The appearances seen on making the direct examination and the treatment adopted were the same in both cases and are detailed below :

CASE 2.—Private patient; female, aged fifty. She had become subject to fits of "choking" during meals six years before she came to consult me. At first the attacks had continued regularly for several months, then there was an interval lasting for two or three years, when the swallowing was normal. But again the difficulty had come on and had continued regularly ever since.

As in the first case, the difficulty in swallowing was constant, not intermittent. It attended every meal and every effort to swallow. She was able, however, to go through a meal without interruption if she chewed her food very thoroughly. But if a large or imperfectly masticated piece was swallowed then she felt it arrested in the throat, and there it remained for two or three minutes, finally passing slowly down of its own accord. The piece of food arrested was not regurgitated. But if she attempted to ignore the obstacle and continued her meal then regurgitation took place. Liquids, however, could be forced past the obstruction, but they made a splashing noise. On one occasion a small tablet had stuck, but it also passed down of its own accord.

The pharyngeal and lingual tonsils in this case were enlarged. Otherwise, no abnormality was detected on ordinary examination.

*Direct examination* with a small-calibre œsophageal tube—preferable for the first examination except in cases of foreign body—showed in both cases at the lower end of the post-cricoid sphincter a definite stricture or narrowing of the lumen to a small circular orifice of from 3 to 5 mm. in diameter. It had the appearance almost as if a thread had been tied under the mucosa.

In both of the cases pressure was maintained upon the stricture by the end of the tube for two or three minutes, but it resisted dilatation, and, indeed, on shifting the end of the tube from side to side, it was possible to pull on the stricture and render it crescentic in shape and even slit-like. I naturally concluded, in the first case, from this appearance and behaviour that the stricture was cicatricial, and I proceeded to endeavour to pass a bougie through it by way of the direct tube. To my surprise the bougie passed at once without any sensation of obstruction whatever, and on withdrawing it I found that the stricture had disappeared, and that the examining tube could now be passed on down the œsophagus with ease.

The bougie was, however, reinserted for half an hour, and in neither case have the symptoms of obstruction recurred. Both patients are now able to swallow their food without any difficulty whatever.

The first case was treated eighteen months ago, and I have repeatedly examined her since without finding any sign of stricture.

In the second case after the dilatation I was struck with the liveliness of the contraction wave in the œsophagus immediately below the seat of the stricture.

I must add that in neither case could any sign of an organic lesion be discovered.

We have been able to establish the existence of spasmodic stricture of the œsophagus at the cardiac end and in mid-thorax; and now, as these cases show, we may encounter the same kind of stenosis at the upper end of the œsophagus (or lower end of the pharynx).

## SOCIETIES' PROCEEDINGS.

## ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

*May 4, 1917.**President: MR. T. MARK HOVELL.*

**Remarks on Treatment of Irritative Coughing.**—**T. Mark Hovell (President).**—I have practically discontinued the use of trichloroacetic acid for the treatment of irritative cough because I found that, in many cases, it produced a considerable amount of irritation which sometimes continued for several days, and I now employ instead a solution of perchloride of iron, 4 dr. to 1 oz. in equal parts of glycerine and water: but I always write the prescription as 240 gr., as otherwise the chemist is liable to dispense the liquor, which, as you know, contains much more free acid, which is not required and is better omitted.

I may mention also that Messrs. Hall & King, chemists, of Folkestone, have prepared for me, with the juice of garlic, an acetic syrup, an elixir, and an oxymel, all in the proportion of 1 in 5, so that now garlic may be administered by the mouth and thus save the more troublesome method, to which I referred into my Introductory Address, of cutting the cloves into thin slices and wearing them under the soles of the feet between two pairs of socks. These preparations are not disagreeable, and with the addition of honey or treacle they will be readily taken by most children if they dislike the preparation in its crude form. The dose of the juice of garlic as prepared by Martindale is 10 to 30 minims.

Although garlic will destroy the micro-organism of whooping-cough it must not be forgotten that, for the cure of the cough, an astringent must be applied to the lingual tonsil.

**Adherent Soft Palate.**—**G. W. Dawson.**—Patient, a male, aged twenty-three. At the age of twelve he had a sore throat, which lasted two years, and for which he was treated. However, when he was aged sixteen the nasopharynx became closed, and he states that he was operated on four times and wore a tube in his nose for six weeks. When I saw him in October, 1916, the post-nasal space was completely shut off from the pharynx, and he was rapidly going deaf. In November I made an opening in the adherent palate, which was thick, and introduced a rubber tube, which he has worn ever since, with great benefit to his hearing and general comfort. Wassermann's reaction was strongly positive.

**MR. HERBERT TILLEY:** The patient will be relieved, but only so long as the tube remains in position, and I should like to know how long Mr. Dawson proposes to leave it there, and how long he thinks it will be before the edges are covered with epithelium. If his method fails, perhaps he will feel inclined to adopt the method I described some years ago, when I showed two cases some months after operation. It entails

dividing the adhesions between the palate and the posterior wall of the pharynx, and inserting a silver-wire suture from before backwards at the junction of the soft and hard palate, letting it pass over the posterior free surface of the soft palate, to re-enter it on the posterior aspect of the free margin of the soft palate. The two strands are brought forwards and fixed over one of the incisor teeth. This is done on each side of the midline, and the wires are allowed to stay in a week, or until they cut out. This is a modification of a method described by Mr. W. G. Spencer many years ago at the old Laryngological Society.

The PRESIDENT: There is one method of preventing adhesions, which is not generally known. About seventeen years ago, a young lady had her soft palate very seriously torn at an operation for removal of adenoids. When I saw her, extensive adhesions had formed between the soft palate and the posterior wall of the nasopharynx, leaving only a small aperture. Sir Frederic Eve, who performed the operation for me, had a prepuce which he had removed immediately before the operation commenced, which he split and stitched to the edge of the soft palate and base of the posterior pillars. The result has been extremely satisfactory. I saw the patient a year ago, and a free opening still remains. I agree with Mr. Tilley that directly the tube is removed from Mr. Dawson's patient, the opening will close; but if it were to be operated upon as Mr. Tilley suggests and then some mucous membrane stitched on, the result might possibly be good.

Dr. JOHNSON HORNE: The note that the Wassermann reaction was strongly positive is the all-important factor in this case. I have had excellent results in two traumatic cases such as the President described, but we know the tendency for plastic adhesions to form in syphilitic cases.

Dr. DAN MCKENZIE: I should like to advise members against operating on these cases unless they are sure that the activity of the original malady has ceased. I say that because I have, by operating, set up again an amount of ulceration which ultimately left the patient decidedly worse than he was before.

**Nasopharyngeal Fibroma.—G. W. Dawson.**—Patient, a boy, aged fourteen and a half, complained of nasal obstruction for six months. Swelling appeared at the right anterior naris two months before operation. There was slight swelling of the right cheek. He was in no pain, but was very drowsy. On October 20, 1916, after a preliminary laryngotomy, the growth was removed. It was found very dense and tough, attached to the roof and right side of nasopharynx. The antral wall was eroded and admitted a finger.

Dr. IRWIN MOORE: Were there attacks of hæmorrhage before the operation? The growth is either recurring or has not been completely removed. Might it not be a fibroma originating in the nose from the ethmoid or the antrum, with adhesions in the post-nasal space?

Dr. PEGLER: Mr. Dawson asked me to look at his section, and I conclude at once it is not a true nasopharyngeal fibroma, but a diffuse angio-fibroma, which has taken to growing into the nasopharynx. A true fibroma is not very vascular: the difference between the two types is very considerable from the point of view of vascularity. Pure nasal fibromata are very rare.

Dr. JOHNSON HORNE: I agree with Dr. Pegler. The angiomatous element is the more important of the two. I agree also that, in most cases, these spring from the basisphenoid.



Mr. DAWSON (in reply): My first case had been operated upon four times, and when the man came under my observation he was distressed by the amount of deafness, which was rapidly becoming worse. That decided me to reopen, and see what would happen. Immediately it was opened he recovered his hearing, and expressed himself as feeling generally better. I found the scar tissue more than  $\frac{1}{2}$  in. thick, so that one could not manipulate it; so I think it would have been very difficult to carry out the wire treatment. If the tube is left out a few days, closure occurs; I leave it in because the patient prefers it so, and is then more comfortable. In my second case the fibroma protruded from the front of the nose, and bulged the palate downwards. It was attached to the roof and side of the nasopharynx, and its broad attachment was very tough, so that it was difficult to make any impression on it. With a raspatory and strong forceps I removed it piece-meal, as best I could. I could not get it all away because the boy collapsed towards the end of the operation. The growth caused an opening in the antral wall; one could introduce the finger past the tumour, and the opening felt as if it were eroded. I have no doubt it was due to pressure. He only had several slight hæmorrhages before. During the operation hæmorrhage was severe.

**Right Optic Neuritis caused by Suppuration in the Right Posterior Ethmoidal Cells and Sphenoidal Sinus.—E. D. D. Davis.**—A. B—, a fishmonger, aged forty-nine, was sent to the hospital with right exophthalmos, with restriction of movements of the right eye in all directions. Right optic neuritis and loss of sight. Vision,  $\frac{6}{30}$ . The loss of sight was of four weeks' duration, and exophthalmos two weeks. The left eye was normal. On December 29, 1916, I examined the nose and found tenderness of the floor of the right frontal sinus. No tenderness on pressure of the eyeball, or during movement of the eye. The nose showed polypoid middle turbinats, with pus in the right olfactory cleft; the signs of right nasal sinus suppuration were obvious. There was no suppuration of the left side. The maxillary and frontal sinuses were dark on both sides. The right maxillary was syringed out with a Killian trocar and contained no pus. X-ray: Small right frontal sinus; no evidence of cause of exophthalmos. January 2, 1917: About six weeks after onset of defective sight, both middle turbinats were removed, the right ethmoidal cells and sphenoid were opened. The fronto-nasal duct was enlarged and a right intranasal antral operation was performed. Pus was *only* found in the posterior ethmoidal cells and sphenoid. The maxillary sinus was normal. February 2: Mr. McMullen reported the eye to be practically normal, vision  $\frac{6}{12}$ , and that the exophthalmos and optic neuritis had disappeared.

Mr. MOLLISON: It is not entirely proved that Mr. Davis's operation restored the patient's sight. I have seen these cases of blindness coming on for no obvious reason, and have removed the middle turbinal once or twice, simply in order to feel that I had left nothing undone, and in a month or so the patient recovered. But we cannot say that because the recovery followed an operation, such as the opening of the posterior ethmoidal cells, that these cells were the only cause of the blindness.

Dr. DAVENPORT: Although what Mr. Mollison says about retrobulbar neuritis is true, we know that the condition clears up spontaneously, yet here there was definite purulent disease of the nose and the nasal sinuses; and at this time of day I do not think one can doubt that optic neuritis is induced by suppuration of these sinuses.

MR. DAWSON: I had a similar case in February, 1916, in a woman. A little pus was observable in each olfactory cleft, but there were very few symptoms otherwise. She had a slightly deflected septum, particularly at the upper part, which rather obscured the ethmoid region above. With the right eye she could only distinguish the difference between light and darkness, and the other eye was little better. I did a sub-mucous resection, and found the ethmoid soft immediately above. I scraped both sides, and in two days she had recovered her sight. Vision returned to  $\frac{6}{6}$  in each eye. I should like to hear an explanation as to why the recovery of sight was so rapid.

DR. P. WATSON-WILLIAMS: This is a good example of a kind of case which probably most of us have encountered. There are one or two points to be emphasised in connection with sinus infection in relation to optic neuritis. The connection between the two was recognised as far back as the days of Berger, and he introduced the term "canalicular neuritis." I think one of the reasons we have failed to make the advance we might have done, lies in the fact that if there is no gross evidence of suppuration, we are apt to negative the nose as a possible cause of the optic symptoms. We may be unlucky in catching the secretion as it escapes from the sphenoidal sinus; it may be seen at one time, and a few minutes later the evidence may disappear. Given an infective sinusitis. I think it is when the leucocytosis is poorly marked and the secretion is mainly clear mucus and is not at all abundant, that infective conditions of the sphenoidal sinus leading to canalicular neuritis are most apt to occur. The reason is that polynuclears inhibit the organisms to such an extent that when there is much suppuration there is less likely to be toxic absorption, just as when a *post-mortem* wound does not suppurate there is more likely to be a systemic infection. So we must examine very carefully, and not be guided by the presence or absence of suppuration. We must be particularly suspicious when there is a nasal field contraction or relative scotoma, for then the case is much more likely to be due to sinus disease. When later the manifestations of suppuration are more pronounced, it may be too late to do anything.

MR. CLAYTON FOX: It is very important, in these cases, to pay particular attention to the condition of the optic disc, especially in the early stages of the neuritis. The first change seen is in the periphery of the disc, and that causes enlargement of the blind spot. That is a very important matter, because it constitutes direct evidence of the periphery of the nerve being involved.

**Left Optic Atrophy caused by Suppuration in the Posterior Ethmoidal Cells, Sphenoidal and Maxillary Sinuses of the Left Side.—E. D. D. Davis.**—A warehouseman, aged fifty-seven, complained of loss of sight of left eye for ten weeks, and long-standing nasal obstruction. He had nasal polypi for years, which were removed at intervals. The sight of the right eye was becoming slightly misty. He was seen by Mr. McMullen on June 20, 1916, who found left optic atrophy, the pupil reacting sluggishly to light. No pain on pressure on the globe or on movement of the eye. He could only see hand movements in the upper nasal half of the field of vision. Right eye, vision  $\frac{6}{6}$  partly. He was sent to me for an examination of the nose. Both sides of the nose were full of polypi, with suppuration on the left side. The left frontal sinus and maxillary antrum were dark. Both clear on right.

July 19, 1916: Middle turbinals and polypi removed. Both sphenoids and ethmoidal cells opened. Both maxillary and left frontal sinus

opened by intranasal operation. The left sphenoid, posterior ethmoidal cells, and left maxillary antrum contained pus and polypi.

Three days after operation the patient volunteered the statement that he could see better with the left eye. On October 20, three months after operation, the sight of the left eye had improved, the pupil reacted to light, and the periphery of the field of vision was normal, but there was a central scotoma.

Mr. E. D. D. DAVIS (replying on both cases): During the last eighteen months, ophthalmic surgeons have sent me sixteen cases of blindness which they called either optic neuritis or retrobulbar neuritis. In only two was nasal disease detected, the two now shown. The nasal disease—polypi and suppuration—was obvious, and the sight improved after operation. Early operation gives a better chance of recovery, because cases due to nasal suppuration go on to atrophy, and then whatever is done does not improve the sight. Two cases were instances of syphilitic neuritis, which were treated in the ordinary way with benefit. In one case there was double optic atrophy of doubtful origin. One sphenoid had been operated upon, and I operated upon the other, but found nothing, and there was no improvement. Of the other class, so-called retrobulbar neuritis, there were eleven cases, and in these I examined the nose on several occasions, exploring the sphenoids with the Eustachian catheter. I also explored the maxillary antra, but none of these examinations yielded any result. Wassermann reactions, urine, nervous system, and X-ray examinations, and searches for tuberculosis were all negative. Two patients were suspected of tuberculosis, but no evidence was obtained. These cases usually occur in young women under forty, and the degree of visual defect varies. It is usually of sudden onset, and unilateral. In a month or six weeks the sight improves and the patient is much better, but a recurrence is apt to follow. Ultimately there is recovery. What is the cause of that type I do not know; the ophthalmic surgeon suggests there is an intermittent catarrh of the ethmoid or sphenoid, and that the sight improves with the disappearance of the catarrh, more particularly as the onset of retrobulbar neuritis is sometimes accompanied by a history of an influenzal cold. I had charts of the fields of vision made, so that we might know what fibres of the optic nerve were affected. The outside fibres supply the macular region, and, if affected, produce central scotoma. Affection of the nasal side would produce a central scotoma, while the central fibres of the trunk of the nerve go to the periphery of the field. But the charts were of little value; in both the cases which had nasal disease there was a central scotoma and contraction of the field. The retrobulbar neuritis cases also had a central scotoma and contraction of the field. Two of the patients with retro-bulbar neuritis had slight enlargement of the middle turbinal, and the condition of the nose was doubtful, so I removed the middle turbinals and opened the sphenoids and ethmoids with a negative result and no improvement in the sight. I hope members will be able to find something to account for this condition.

**Acute Osteomyelitis of Frontal Bone secondary to Acute Frontal Sinusitis; Operation; Recovery.**—W. M. Mollison.—Male, aged fifteen, attended hospital on February 22, 1917, on account of pain and swelling on the forehead. He gave the following history: "For several years attacks of epistaxis from the left side of the nose; for some weeks (?) frontal headaches. Ten days ago had 'influenza' and suffered



from severe frontal headaches and had discharge from the left side of the nose. This morning the left eye began to swell."

Examination showed swelling over the forehead, most marked over the left frontal sinus; the skin was shiny but not red; there was great tenderness over the whole of the swelling; the left eye was practically closed on account of œdema of the lids; there was some œdema of the right eyelids, but this eye could be opened well. There was creamy pus in the left middle meatus. Temperature 100.4° F. The patient's general condition was good. This examination took place at 4 p.m., and the boy was admitted forthwith.

Operation was performed at 9 p.m.; by this time the œdema had spread very distinctly, both eyes were quite closed by œdema of the lids. The usual incision was made over the left frontal sinus and the sinus opened and pus found; while this was being done the cut edges of the bone were noticed to be oozing minute beads of pus and to be somewhat avascular. It was now realised that extensive removal of bone was indicated; further skin incisions were made—one over the right frontal sinus, which joined the original incision at its lower end across the bridge of the nose; from the centre of this incision across the nose a vertical incision was carried up over the forehead; the flaps thus marked out were reflected up and outwards. Bone was now removed till a healthy cut surface was reached; the frontal bone required removal from one external angular process to the other, and for more than 2 in. in a vertical direction from the fronto-nasal junction; the left ethmoidal cells were found to contain pus and were removed, also the supra-orbital crests and a small amount of the orbital roofs. The cut edge of the bone was then mopped with pure carbolic acid.

The patient made a good recovery, and about four weeks later the flaps of the skin were replaced and sutured.

Mr. TILLEY: I congratulate Mr. Mollison on having saved this boy's life, because osteomyelitis of the frontal bone is nearly always fatal. Those who wish to inform themselves on the subject cannot do better than consult Dr. Dan McKenzie's article in the *JOURN. OF LARYNGOL., RHINOL., AND OTOL.*, 1913. During the last six months I have been asked to see two cases presenting that condition: one not as a result of operation, but a complication of an acute, unrecognised frontal sinus separation of influenzal origin. The following were the main features in the case: Intense œdema of the left upper eyelid, chemosis of conjunctiva and some proptosis. Œdema over the supra-orbital region which extended to the neighbourhood of the parotid gland and over the ascending ramus of the jaw. Deep pressure over the region of the frontal sinus caused much pain. Pus present in the left middle meatus. The frontal sinus was opened by an incision just below the level of the eyebrow. Pus and bubbles of air escaped. The whole anterior wall was removed and the inflamed mucous membrane wiped away. Small beads of pus could be seen in the diploë bordering the edges of the sinus. Pus continued to discharge freely from the wound for six weeks and it was irrigated twice daily. Meantime the non-inflammatory œdema of the skin on the left frontal bone continued to spread until it reached beyond the hair-line. The whole of the left frontal bone was then exposed and found to be extensively necrosed in many areas, while in others the bone was inflamed. In removing the necrosed portions, adherent dura mater and cortical substance of the brain came away. In spite of such desperate conditions, the patient has recovered completely, although a metastatic abscess in the left breast and an attack of acute facial erysipelas after



her return home gave us considerable anxiety. In the second case I adopted an incision which avoids the occurrence of the median vertical scar in the forehead. A transverse incision is made in the scalp beyond the hair-line, extending outwards and downwards to the temporal fossa; from the lower end of this a second incision is made forwards to the external angular process of the frontal bone, where it joins the outer limit of the original incision in the eyebrow (for opening the frontal sinus). The small incision in the temporal fossa healed without leaving any visible scar.

Dr. DAN MCKENZIE: I also would like to congratulate Mr. Mollison on the very prompt and efficient manner in which he tackled the case, for to that was due the saving of the boy's life. Even when there is an abscess in the soft parts, one's mind is occupied about the frontal sinus, and if, on getting through the bone we happen to find it diseased, it then requires considerable moral courage to extend the operation sufficiently to get beyond its limits if they are wide. I advise caution in regard to the prognosis of these cases. This boy looks well now, but, unfortunately, in this disease one cannot be sure, until at least six months have passed, that the condition will not return. There have been cases in which the surgeon thought he had removed every bit of disease, and the patient remained well for a considerable time, but at the end of it there was a little puffy swelling in the neighbourhood, and it developed into a recurrence. But we must not be too despondent about these cases, because there have been cases in which prompt and thorough removal of diseased bone has resulted in permanent cure. And if there be no recurrence, in course of time the bone removed is replaced, so that in this case the forehead will be as good as before, as the frontal eminences will be restored. That, however, does not apply to the supra-orbital margins, I fear. My paper<sup>1</sup> showed that the cases which had come on after sinus operation did not recover: the only cases which recovered were some of those which had been dealt with surgically in a very thorough manner, and in which the osteomyelitis had set in spontaneously.

Dr. P. WATSON-WILLIAMS: What were the organisms in this case? If these were determined, it might be an indication for treatment which might tend to keep off recurrences. I should also like to know how much bone was removed. The success in this case is certainly a matter for congratulation.

Dr. JOBSON HORNE: Dr. Dan McKenzie said that osteomyelitis is very fatal when it follows operation upon any sinus. Does he include in that the antrum? [Dr. MCKENZIE: Yes.] I should have thought that osteomyelitis following upon operation on the antrum of Highmore would be very rare, and, if it did occur, that the patient would very likely recover. I agree as to the grave outlook in these cases generally; in fact, I believe external operations on the frontal sinus are more fatal than we think.

Dr. IRWIN MOORE: Mr. Norman Patterson has asked me to show the photograph of a very interesting case of osteomyelitis which started after an operation on the frontal sinus. He operated upon the case twelve times, the whole of the frontal bone being eventually removed. The patient, an Australian soldier, has now rejoined his regiment. Mr. Patterson hopes to speak more fully on it when he returns from France.

Mr. O'MALLEY: I recently had a case, which turned out eventually to be syphilitic, in which there was an infection by the ordinary micro-organisms. There was a history of the right frontal sinus having been

<sup>1</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL., January, February, March, 1913.

opened, and of redness and tenderness over it, with swelling extending to the outer angle of the eye. A few days afterwards I laid it open, and tried drainage and ordinary treatment, but with no effect. There was no appreciable rise of temperature. In a few days the œdema had extended to the outer angle of the other eye and across the forehead, so that both eyes were closed with œdema. Therefore, I laid him open from one malar bone to the other, and found that the walls of the frontal sinus had gone, though only one had been operated upon, and the bone had been replaced by granulation tissue, the latter having also replaced the supra-orbital ridges, and the fronto-malar joint was in a similar condition. After clearing it out thoroughly and dressing the wound, I thought I would have the Wassermann test done. It was positive. Improvement followed soon after the iodide and mercury mixture had been started, and after injection with "606" there was a marvellous clearing up. There may be a syphilitic factor in some of the cases one hears of. The present case seems to have been an ordinary acute osteomyelitis.

Mr. E. D. D. DAVIS: I have seen two cases of osteomyelitis following a radical operation for antral suppuration. In the operation I did the antrum was vigorously curetted, and the patient died of osteomyelitis and meningitis some weeks later, in spite of a second operation. In another case seen by me, curetting of the ethmoid produced osteomyelitis and death. I have only seen one case of osteomyelitis following a frontal sinus operation. The frontal sinus had been attacked on three occasions by a surgeon, and I did a fourth radical operation, establishing free drainage into the nose. The patient developed chronic osteomyelitis of the frontal bone, and, I believe, died eighteen months later.

Mr. H. J. BANKS DAVIS: It would be interesting to know, in cases of osteomyelitis following the antral operation, whether the operation done was the intranasal one alone or the complete operation. I do not agree with the present tendency to do the intranasal operation: it does not suffice, because often one finds the antrum filled with polypi, which cannot be properly cleared out by operating through the nose only. This does not apply to acute cases, where polypi have not had time to form or the disease to become chronic.

The PRESIDENT: I am strongly of opinion that the antrum should be cleared out by the external operation, and then an opening made through the inner wall for dressing and washing out. I agree with Mr. Banks Davis that septic matter is very liable to be left behind when only the intranasal operation is done.

Mr. CLAYTON FOX: I should like to ask what the patient dies from in these cases of osteomyelitis in connection with the jaw. The term osteomyelitis was applied a few years ago only to cases in which there was inflammation of the marrow of the bone. It now seems to be used if any part of the maxilla becomes inflamed. The nature of the operation is important. If the radical operation is accompanied by scraping out, there is more likely to be infection. But these cases of osteomyelitis can be separated from those in which there is extensive inflammation of the diploë between the two tables of the skull bones. Osteomyelitis arising from operation on the maxillary sinus is only a matter of infection, which may occur even when only a portion of soft tissue is removed. There must be some inflammation after operation on any portion of tissue, and the bone concerned must be infected for the time being, though perhaps not sufficiently to produce general symptoms, such as pyæmia.

Mr. MOLLISON (in reply): I regret to say that the nature of the micro-organism is not known. The operation was done late at night; a

swab was taken, but seems to have been lost. With regard to the amount of bone removed, I took away both outer and inner tables, exposing the dura well on to the forehead almost as high as the upper limit of the vertical scar. I took away bone from the external angular process on one side by a curved incision made to that on the other side, also the supra-orbital ridges and a portion of the roof of both orbits. I was not convinced I got beyond the disease at the right external angular process. There are two classes of cases of osteomyelitis of the frontal bone. One is typified by this case of mine. The other class contains those in which the disease came on subsequent to the performance of a frontal sinus operation. These classes are to be separated from one another from the point of view of prognosis. I have no doubt that extensive operation at once is the only treatment; it is of no use to do the operation in portions. I have had three fatal cases in which osteomyelitis has come on subsequent to operations on the antrum or frontal sinus. I am sure the initial mistake of not doing enough at first is fatal. A little point of importance in this case was the treatment of the bare edge of the bone; I painted it with pure carbolic acid, in the hope that any organisms left in the wound would thus be prevented from getting into the bone surface exposed.

**Carcinoma of Maxillary Sinus, Three and a Third Years after Operation, with no Recurrence.**—W. M. Mollison.—The patient, a female, aged fifty, was shown to the Section in 1914.<sup>1</sup> Original operation, January, 1914; removal of carcinomatous glands, April, 1914. Recently a gland was felt in the submaxillary region, and it was thought to be the seat of recurrence. It was removed in January, 1917, but microscopical examination showed it to be merely inflammatory.

Mr HARMER: The notes do not state whether this carcinoma was of an epitheliomatous nature or of the columnar-celled variety. If it was an epithelioma it is a remarkable recovery; if columnar-celled there is nothing unusual in the history of the case.

**Skiagraph of the Skull of a Patient suffering from Tumour of the Pituitary Body, with Brief Notes of Operation and Result.**—Herbert Tilley.—J. D. K——, male, admitted on March 6, 1917. He gave a history of severe headache on the left side of some three and a half years' duration. About middle of May, 1916, he noticed marked dimness of left eye. August 21, 1916, an ophthalmic surgeon in New York found a "large scotoma (temporal) of left eye. The fundus of the same eye has small arteries and large veins." Mr. Cecil Snell, of Sheffield, saw the patient in October, confirmed the above findings, and found the right eye healthy, but on February 21, 1917, he discovered that the patient had bilateral hemianopia, "the right optic disc is slightly pale, the left one markedly so. There has been no optic neuritis." "He is now quite unable to read." Wassermann reaction negative. No improvement under iodide of potash.

On March 6, 1917, I saw the patient for the first time. When resting his pulse was 60. Examination of nose revealed no abnormality beyond absence of left middle turbinal, which had been removed last year. I referred him to Dr. Finzi, who provided me with the radiographs exhibited.

March 22: Operation. Moure's lateral rhinotomy on left side; sub-mucous resection of the posterior third of septum, removal of anterior wall and septum of the sphenoidal sinus, followed by removal of postero-

<sup>1</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL.



superior wall of sinus and portion of tumour. A loose wad of gauze was inserted into sinus and the external wound was sutured. Great care was taken not to wound the easily visible lateral walls of the sinus and yet next morning the right upper and lower eyelids were intensely ecchymosed, but not swollen.

The patient made an excellent recovery, and the pulse, which was 54 on the evening before the operation, rose to from 65 to 72 during the time he was in the nursing home.

April 12: The patient can now read a little without any difficulty.

*Remarks.*—The exact nature of the tumour was not determined, and the ultimate issue of the operation cannot yet be stated, although there is marked improvement in his pulse-rate and the patient is delighted with the improvement in his sight. One of the main reasons for bringing forward the case is to emphasise the easy access to the sphenoidal sinus regions which was provided by Moure's lateral rhinotomy.

Dr. DAN MCKENZIE: We have not had many opportunities of seeing cavernous sinus thrombosis, but I suggest that in future it will be possible to make a surgical attack on the cavernous sinus by means of this operation. If I have such a case I shall certainly attempt to get at it through the nose, by the route so successfully adopted in this case by Mr. Tilley.

**Skiagrams Illustrating Spasmodic Stricture of the Thoracic Œsophagus.**—Dan McKenzie.—The skiagrams were taken by Dr. Robert Knox.

The first (see figure, p. 282), taken during the phase of active spasm, shows the bismuth mixture arrested about the level of the ninth rib. The shadow shows, by the typical pointed lower border, that there is no dilatation above the stricture.

The second shows the thorax in an interval between the attacks, and, the œsophagus being normal, the bismuth mixture is passing without any "hold-up."

The patient is a lady, aged twenty-five. Occasional difficulty in swallowing was first experienced in 1910, and in 1911 the attacks became frequent and pronounced. She married in 1912 and has two children.

When first seen the attacks were very troublesome, coming on at irregular and unexpected times, and varying in degree, although, as a rule, the obstruction was so great as to prevent even soft solids being swallowed, and sometimes liquids were also arrested and obstruction was absolute. The attacks lasted from a few seconds to several days, and the patient was always aware of their onset by feeling a "grip" in her throat. The relaxation of the spasm was also manifested by a feeling of relief. During the intervals between the spasm the patient could eat anything. She was seriously emaciated when first I saw her. Since treatment was begun the attacks have practically ceased; none has lasted more than a few seconds, and these have only occurred once or twice in a month. The treatment consisted in the administration of bromide, and during an attack, of atropin  $\frac{1}{150}$  gr. sublingually. The improvement, however, set in immediately after the first X-ray examination.

Mr. Dawson: I recently had a case which might have been one of spasmodic stricture of the œsophagus—a young woman who for a long time had had difficulty in swallowing. I passed the œsophagoscope, and she said she was much better, and she remained better for a month. Then she returned with a slight recurrence, and the passage of the œsophagoscope relieved her again.





Skiagram taken during phase of active spasm. Bismuth mixture arrested at level of the ninth rib. (Dr. Dan McKenzie's case, p. 281 )

**Retropharyngeal Abscess; Injury to the Cervical Sympathetic—an Unusual Complication following Operation by the External Route.**—**Irwin Moore.**—This patient, a female, aged twenty-five, was shown at the meeting of this Section on April 7, 1916,<sup>1</sup> two weeks after operation. The abscess was opened by careful dissection along the posterior border of the right sternomastoid,  $\frac{1}{2}$  oz. of pus evacuated, the abscess wall, which was found to be much thickened, was curetted, and a drainage-tube inserted. Examination of the pus showed tubercle bacilli. The wound healed in six weeks and there has been no recurrence. After the operation the patient unfortunately suffered from paresis of the right cervical sympathetic, manifested by:

*Pseudo-ptosis*—slight drooping of the upper lid causing narrowing of the palpebral fissure, due to paralysis of the unstriped muscle-fibres of Müller.

*Enophthalmos*—sunken appearance of the eyeball, which looked smaller than its fellow, and resembling a badly-fitting artificial eye.

*Contraction of the pupil*, with absence of dilatation on shading the eye.

*Paresis of the upper portion of the right trapezius muscle* was also present, shown by the fact that the patient was unable to shrug her shoulder when pressure was made from above. (Cervical plexus from third and fourth nerves.)

The case is again shown because there was considerable doubt as to whether the paresis would improve, and to draw attention to the possibility of such an occurrence with its accompanying disfigurement, which is ignored in surgical text-books. Treatment by faradism was carried out. Fortunately the symptoms have now cleared up, as may be seen by a comparison with the photograph taken two weeks after operation.

**Mr. H. J. BANKS DAVIS:** In these cases I am now in the habit of opening through the mouth, though I know it is supposed to be a wrong procedure. Sometimes there is great difficulty by the neck route. I remember operating on a child, aged eight, with retropharyngeal abscess and secondary œdema of the neck. Landmarks were obliterated, and the incision exposed the anterior border of the sternomastoid instead of the posterior, and in opening the abscess the greatest difficulty was experienced, the neck wound being of enormous depth. I now employ the buccal route with sinus forceps, and I have not seen trouble following. As students, we were taught it was fatal to open through the mouth, though I believe that this is the method in vogue at Great Ormond Street Children's Hospital.

**Mr. TILLEY:** I uphold what Mr. Banks Davis says and I do not think it is a wrong method. At a large fever hospital in London they make no difficulty about opening retropharyngeal abscesses from inside the mouth. No anæsthetic is given, and the patient's head is held as if for an examination for adenoids. The surgeon opens the abscess with his index finger, and after evacuating the pus the patient is returned to bed and made to lie for two or three days with the head hanging backwards over a pillow, so that no pus can be inhaled into the lower air-passages. The cases seem to do very well. The external route should, of course, always be employed when the retropharyngeal abscess is due to caries of the cervical spine.

**Dr. IRWIN MOORE (in reply):** The last two speakers referred to retropharyngeal abscesses in children, and there is no doubt that in these cases opening from the mouth is the correct way. In the case I have

<sup>1</sup> JOUEN. LARYNGOL., RHINOL., AND OTOL.

shown there was a question as to whether it should be done through the mouth or through the neck. This patient's age was twenty-five, and her child had recently been operated upon for tuberculous glands in the neck. I thought this abscess might be found to be tubercular, and therefore it would be better to drain it from the outside to prevent the discharge re-infecting her. The pus from the abscess contained tubercle bacilli. The sac of the abscess was so much thickened that the question of dissecting it out was raised, but I did not attempt it. The wound healed up in six weeks, and the thickening and swelling have now disappeared.

(To be continued.)

## Abstracts.

### PHARYNX.

**Wound of the Pharynx by Bullet: Fracture of Fourth Cervical Vertebra: Meningitis: Death.**—A. Mouchet. "Bull. de la Soc. de Chir.," t. xliii, no. 23.

Senegalese soldier, admitted with small, round wound on each side of neck, almost symmetrical, but the right wound a little anterior. On admission, before being seen by a surgeon, the patient, being very hungry, obtained some food which he attempted to swallow. This caused him great pain, and the food came out through both wounds. After this, patient was fed through a tube. Subsequently both wounds healed up. About a month later patient's temperature rose, and he had pain on swallowing. Soon neck rigidity and other signs of meningitis appeared. Death.

*Post-mortem.*—Bullet had entered the right side of the neck, perforated the right ala of the thyroid cartilage, traversed the pharynx, and had entered the body of the fourth cervical vertebra, the left half of which was shattered. There was a tiny perforation of the dura, probably due to a spicule of bone. The track of the exit wound was behind the left common carotid artery. The whole spinal subarachnoid space was full of thick pus right up to the bulb.

J. K. Milne Dickie.

### NOSE.

**Adrenalin-pituitary Treatment of Asthma.**—Bensaude and Hallon. "Presse Médicale," April 8, 1918.

Good and prompt results are obtained by subcutaneous injection of adrenalin or pituitary extract or a mixture of the two. The action of pituitary extract is slower than that of adrenalin but is more durable, and seems to act not only on present attacks but as a preventive to a certain extent of future attacks. The solution used by the writers contains 0.5 mgr. of adrenalin hydrochloride and a quantity of extract of whale pituitary, disalbuminised, corresponding to 0.25 grm. of fresh gland to the c.c. It is sterilised and put in ampoules.

The dose generally used for adults has been 1 c.c. *per diem*. In one instance a patient, without the doctor's knowledge, took three injections

in twelve hours without any bad effect. For children the dose is diminished according to weight.

In nearly all cases the injection causes a diminution of the severity of the attack. The effect takes place usually in twelve to fifteen minutes, and one injection is enough to control the paroxysm. There is generally immediate and complete relief. In cases where patients have required injections on several days successively, the effect of the second and third doses is superior to that of the first. In every case in which one dose produces a definite result, the same dose will always suffice and always retain its full effect. Thus one patient has used the remedy for four years always with the same dose and with equal success.

Out of fifty-six cases only five were a complete failure and did not react to this treatment. The writers have seen no bad effects from the injections. In most cases not the slightest malaise is produced, but in some a slight tremor, or feeling like an electric thrill, or agitation and palpation were noticed, but these unpleasant effects disappeared in a few minutes.

*J. K. Milne Dickie.*

#### Intranasal Drainage of the Frontal Sinus.—E. Fletcher Ingals.

"Annals of Otol-ogy, etc.," xxvi, p. 656.

After dealing with the history of this method of draining the frontal sinus, the author describes his own in detail, detailing his essential instruments. The nasofrontal duct is first anæsthetised by a special canula and a probe is passed into the sinus. To avoid danger, frontal and lateral skiagrams are taken with the probe *in situ*. In all cases the anterior third of the middle turbinated body is removed before operation and the sinus well washed out, if possible. A perforated bar is slipped over the probe and the sinus opened "in a second or two." A bent tube packer is then passed in and gauze introduced through it, saturated with camphor and carbolic acid, and allowed to remain for five minutes. A gold drainage-tube is left in for three to four months.

*Macleod Yearsley.*

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### LARYNX.

#### Technique of Extirpation of the Larynx under Local Anæsthesia.—

P. Sabileau. "Bull. de la Soc. de Chir.," xliii, 7.

With local anæsthesia the patient does not run the same risk of broncho-pneumonia as with general anæsthesia, and therefore it is not necessary to do a preliminary tracheotomy, and, indeed, it is preferable to do the whole operation at once as a preliminary tracheotomy makes the operation more difficult. Under general anæsthesia, on the other hand, it is much safer to do a preliminary tracheotomy; under local anæsthesia it is fairly easy to dissect out an intact trachea; but if there is a tracheotomy opening, the slightest amount of blood trickling through the opening causes violent efforts to expel it, and the operator finds it very difficult to proceed. Many cases come for operation already tracheotomised, and for these the writer has devised a method of preventing blood from entering the trachea.

After removing the tracheotomy tube the trachea is anæsthetised by mopping it with 10 per cent. cocaine. A rubber tube as large as possible is introduced for 2 or 3 cm., and is fixed by three sutures to the skin. After anæsthetising the operative field in the ordinary way, two parallel incisions are made from the hyoid to the suprasternal notch at a distance



of 3 cm. from the middle line. The skin marked out is freed from above downwards and then stitched round the rubber tube, thus sealing off the trachea and preventing any blood from trickling down. The writer claims that the dissection of the deeper parts is made much easier by the skin resection. There is no difficulty in bringing the parts together afterwards.

*J. K. Milne Dickie.*

## ŒSOPHAGUS.

**Portion of Dental Plate Stuck in Œsophagus; Extraction by External Œsophagotomy.**—A. Mouchet. "Bull. de la Soc. Chir.," xliii, 15.

An upper denture consisting of four teeth and two hooks was swallowed by a French soldier during sleep. Woke up with feeling of suffocation; thought he had swallowed some straw, but soon noticed that his denture was missing; vomited frequently. Next morning reported sick, and his *médecin major* gave him an emetic of ipecac. The retching increased the pain very considerably, and patient felt the plate slip further down. He went to another major, who sent him to hospital at once, where he was seen by the writer. Patient radiographed, and plate seen to be in the cervical œsophagus. Removed by œsophagotomy. On incision the œsophagus was found to be considerably infiltrated. The plate was then extracted by gentle manipulation. One of the hooks was deeply embedded in the œsophageal wall. Œsophagus sutured. Small drain left in lower angle of skin wound. Recovery uneventful. Mouchet does not recommend œsophagotomy as a method of choice, but it was the only method possible as no œsophagoscope was available.

*J. K. Milne Dickie.*

## E.A.R.

**Amberine as a Dressing for Mastoid Operations.**—Major Dawse, French Medical Corps. "Rev. de Laryngol. et d'Otol. et de Rhinol.," December 30, 1917.

The melted max is simply poured into the cavity, in the depth of which a wick of gauze has previously been laid. The gauze wick is 2 in. long, and its distal end lies free in the concha, on the surface of the amberine wax. By gently pulling on the wick, the dressing may be removed *en bloc*. The author recommends a daily renewal of the amberine for two weeks.

*H. Lawson Whale.*

**Murphy's Intra-rectal Infusions in the Treatment of Lateral Sinus Phlebitis.**—G. Liébault. "Rev. de Laryngol. et d'Otol. et de Rhinol.," November 30, 1917.

Three cases are described minutely. In only one was the sinus thrombosed; this was treated by curettage without ligation of the jugular. The saline used was always dextrosed; the amount always one litre; and the rate (checked by watching the flow through a glass siphon-tube) from 80 to 100 drops per minute. In the first case six infusions were given in twenty-seven days; in the second, two in seven days; in the third (the case with thrombosis), twenty-seven in twenty-seven days. All three cases recovered after repeated rigors and meningeal symptoms.

The authors follow Moure in decrying the value of ligaturing the vein, chiefly on the ground that any such local measures cannot check

what has already become a systemic infection—that, in fact, the horse has already escaped, so why close the stable? They rely chiefly on general treatment, especially on rectal proctolysis.

*H. Lawson Whale.*

### MISCELLANEOUS.

**The Incidence of Chronic Focal Infection in Chronic Diseases.—L. Langstroth** (San Francisco). "Amer. Journ. Med. Sci.," February, 1918.

This paper is the outcome of work done in the Medical Clinic of the University of California Hospital, where special attention has been devoted to the subject. The results in the majority of cases show the coincidence of focal infection with the different diseases rather than clinical cure or amelioration of the disease. In a number of cases, however, the therapeutic results have been very good, and in a few brilliant. The teeth, prostate, accessory nasal sinuses and tonsils have received particular attention as possible sources of focal infection. The tonsils are often evidently infected, but in many cases it is impossible to say whether they are infected or not; they are a much less frequent focus of infection in adults than in children. The frequently repeated phrase, "small atrophied tonsils," found in the records of the physical examinations, makes it seem probable that the tonsils are very rarely at fault in a patient over sixty, and that in the chronic hypertrophic or atrophic type of arthritis little is to be expected from their removal. Focal infections have been found to be present in 84 per cent. of patients with ulcer of stomach or duodenum, 66 per cent. of acute or subacute cases of arthritis, 73 per cent. of chronic cases of arthritis, and 100 per cent. of gall-bladder cases. The acute and subacute cases have responded well after removal of the foci, even to the point of absolute cure. The chronic cases, when it has been possible to follow them, have in many instances had less pain and no further progression of the disease.

*Thomas Guthrie.*

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### REVIEW.

*The Medical Annual, a Year Book of Treatment, and Practitioner's Index, for 1918* (thirty-sixth year). Pp. 838. Bristol: John Wright & Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. Price 10s. net.

We have received the volume of the *Medical Annual* for this year, and found it as usual full of information in and around our speciality. As an instance of a point of somewhat distant relationship we may mention the article on transverse ridges on the finger-nails. These have been instanced by Chavigny in his lectures on war neuroses as evidence of the genuineness of the "shell-shock" complained of by the patient. It is, therefore, of interest to those who have to deal with the disorders of hearing and speech attributed to this factor. We have sought elsewhere in vain for such a clear statement of the chronology of nail ridges as Dr. French gives us here (p. 355). The article on "Concussion Injuries to the Eyeball" is most valuable in the elucidation of cases of deafness produced by injury to the skull at some distance from the

internal ear. The changes in the eyeball, such as subchoroidal and perineural hæmorrhage, and opacities in the lens have no doubt their analogues in the internal ear and account for what the French designate *surdités à distance*. Among other evidences of pain produced by pressure on a part alleged to be tender is dilatation of the pupil on a sudden, short application of the pressure (p. 339). The reviewer has employed this, a delicate—perhaps too delicate—test of perception of sound in cases of alleged deafness.

The subjects immediately belonging to our department are handled with his usual care and thought by Dr. J. S. Fraser, and the reader who goes carefully through his articles will be abreast of most that is of any value in the oto-laryngology of to-day, including a very full study of the lesions incident to warfare.

Among other articles abstracted or referred to we may indicate as of special interest the one by Dr. Watson-Williams on the exploration of the sphenoidal and other nasal sinuses.

The volume is even richer in illustrations than usual, and it is sure to be as welcome as ever.

Dundas Grant.

## NOTES AND QUERIES.

### SECTION PRESIDENTS FOR 1918-19.

We are pleased to welcome Mr. Hugh Jones, of Liverpool, as the President of the Otological Section of the Royal Society of Medicine for the forthcoming session, 1918-19.

Dr. James Donelan, London, has been elected President of the Laryngological Section of the Royal Society of Medicine for the same period.

Dr. Donelan has recently been promoted from the office of Chevalier to that of Officer of the Crown of Italy, and we have, therefore, the pleasing duty to perform of congratulating the new President upon a double honour.

### OTOLOGY IN 1842.

"Tale of a Trumpet" ("Thos. Hood Comic Annual," 1842, pp. 249-287).—A complete picture of a deaf woman who was so completely cured by an ear-trumpet that she suffered the fate of a witch. Charmingly told by T. Hood and illustrated by John Leech. She "was as deaf as Pharaoh's mother"—

"Whose organs for fear of our modern sceptics,  
Were plugged with gums and antiseptics.  
In short, she was twice as deaf as Burke,  
Or all the deafness in Yearsley's work,  
Who, in spite of his skill in hardness of hearing,  
Boring, blasting, and pioneering,  
To give the dummy organ a clearing,  
Could never have cured Dame Eleanor Spearing."

Said the trumpet-seller—

"You may go to your surgical chaps if you choose,  
Who will blow up your tubes like copper flues,  
Or cut your tonsils right away,  
As you shell out your almonds for Christmas Day,  
And after all a matter of doubt,  
There you go with your tonsils out!"

WYATT WINGRAVE.

### A SAILOR'S DEFINITION OF STRABISMUS.

"The larboard eye keeping the starboard watch."—W. H. Harrison, "The Humourist, 1831, p. 270.

WYATT WINGRAVE.

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## A SEROLOGICAL INVESTIGATION OF VINCENT'S ANGINA.

BY FRANK E. TAYLOR, M.A., M.D., M.Sc., F.R.C.S., M.R.C.P.,  
D.P.H.,

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AND

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INFECTIVE disorders of the pharynx include a great variety of different conditions—ulcerative, membranous, ulcero-membranous, and septic—due to different causal micro-organisms, so that for their accurate differential diagnosis careful bacteriological investigations are necessary.

The nature of these investigations will depend on the clinical appearance which the lesions present. Thus, in membranous inflammations cultures on Loeffler's blood-serum would reveal the presence or absence of the Klebs-Löffler bacillus; in ulcero-membranous conditions the microscopic examination of properly prepared stained films would show the spirochætes and *B. fusiformis* of Vincent; a positive Wassermann reaction would prove the nature of ulcerative conditions to be syphilitic, whilst cultures and films showing streptococci and staphylococci would be obtained in pyogenic infections.

The value of the Wassermann reaction in the differentiation of these various conditions cannot be denied, being positive in syphilitic affections of the pharynx and negative in all others; with the exception of the angina of scarlet fever, which presents sufficiently characteristic symptoms not to lead to confusion, and is not further considered here.

This opinion, however, which is based on the careful bacteriological examination of several hundred cases of sore throat at the Queen Alexandra Military Hospital during the past few months, is quite at variance with the views expressed in several contributions scattered



through the literature of the subject, in which it is maintained that in uncomplicated cases of Vincent's angina the Wassermann reaction is often found to be positive. Thus, StClair Thomson (1) states that "from syphilis the differentiation [of Vincent's angina] is . . . difficult, as both fusiform bacilli and spirilla may be found in a cover-glass preparation from a tertiary ulcer, and also because, apart from concomitant syphilis, the Wassermann reaction may be positive. In more than one case I have seen a suspected Vincent's angina reveal its true nature by the evolution of a coppery rash or other specific stigmata."

The value of this statement is largely invalidated by the vagueness of the diagnosis of the Vincent's angina which was merely suspected. The diagnosis should, of course, have been definitely made by bacteriological examination. Still, allowing that the cases were really Vincent's angina, they would merely confirm Sobernheim's and Weinstein's findings (*vide infra*) that syphilitic and fuso-spirillary pharyngitis may co-exist, and support our own conclusions (*vide infra*) that Vincent's angina may occur in subjects with latent syphilis. Bowman (2), again, considers that "the disease may be confused with syphilis, and Vincent's angina may be superimposed upon a syphilitic or diphtheritic infection of the mouth and throat." Nevertheless, he found that the Wassermann reaction had always been negative in the uncomplicated cases of Vincent's angina seen by him.

Bouty (3) also, describing his experiences of Vincent's angina among the troops in France during the last two years, states that "the Wassermann reaction in Vincent's angina is negative," but the evidence upon which this statement is made is not given. This agrees with the findings of Campbell and Dyas (4), who state that "a positive Wassermann reaction does not exclude Vincent's angina, nor does the fact that a mouth lesion clears up quickly under arsenic exclude syphilis. In cases of Vincent's angina with no syphilitic history, however, the Wassermann reaction is always negative."

Ehrlich (5) in 1910 called attention to the value of intravenous injections of salvarsan in Vincent's angina, and recorded the rapid healing within a few days of the lesions of this disease. Gerber (6) in the same year described a case successfully treated in this way, stating that the Wassermann reaction was weakly positive, and that he had also found it so in a previous case; he considered, therefore, that he could not definitely exclude syphilitic infection. Gerber (7) also quotes Much's (8) own statement, made in 1908, runs as follows: In one other case there was present a Plaut-Vincent's angina in which multitudes of non-specific spirochaetes were found in the tonsil. Lues was excluded, but on what grounds is not stated. The examination of the blood by the complement fixation method, which was undertaken during the febrile stage of the disease, gave a strongly positive reaction. Fourteen days afterwards, when the patient had recovered from the angina, the reaction was found to be negative.

Sobernheim's (9) name is constantly encountered in the literature of the subject as supplying the most definite evidence of the finding of a positive Wassermann reaction in Vincent's angina. His evidence rests solely on three cases, and a critical examination of these shows the filmy basis on which his statements exist.

In the first case the patient presented the symptoms of secondary syphilis—typical exanthem, anal condylomata, and mucous plaques on the

tonsil. While anti-syphilitic treatment was being carried out a deep greyish-yellow coated ulcer, with all the characteristics of Vincent's angina, developed. *B. fusiformis*, *Spirochaeta vincenti*, and *Spirochaeta pallida* were observed by dark-ground illumination. Anti-syphilitic treatment was suspended, serological examination of the blood gave a positive result, and after some days the ulcer healed spontaneously.

The second case was a youth, aged seventeen, who complained of pain in the neck and difficulty in swallowing. The left tonsil was red and swollen, its upper pole being covered with a smeary exudation. The cervical glands were enlarged, but not tender. In stained film preparations *B. fusiformis* and spirochaetes were present in enormous numbers and the diagnosis of Vincent's angina was made. The Wassermann reaction was completely positive. Potassium chlorate lotions were ordered, and healing was complete in eight days.

The third case was a young woman, aged eighteen, in whom the diagnosis of Vincent's angina was made from the condition of the tonsil and the whole course of the illness. The Wassermann reaction was negative. A few days later an ulcer of the tonsil appeared, which rapidly cleared up without specific treatment. Mucous plaques developed later on both tonsils, and the patient was then placed on anti-syphilitic treatment.

Sobernheim concludes that great caution must be exercised in applying the Wassermann reaction to the differential diagnosis of lues and Vincent's angina.

In the first and third of these cases it is obvious that the syphilis and the Vincent's angina were merely concurrent infections, and that in the second case latent syphilis, either congenital or acquired, could not be excluded with certainty.

Weinstein (10) also discussed the value of the Wassermann reaction in rhino-laryngological practice. He stated that in cases of Vincent's angina the ulceration of the tonsil may sometimes appear to be syphilitic, and that neither the clinical appearances nor the microscopic findings are sufficient to establish a definite diagnosis with certainty. In such cases he states that he has employed the Wassermann reaction with good results, and gives his experience of four cases. A woman, aged twenty-four, suspected to be syphilitic, presented the typical appearances of Vincent's angina with an immense number of fusiform bacilli and *Spirochaeta buccalis*. The Wassermann sero-diagnostic test was completely negative. In two other persons suffering from Vincent's angina, with the characteristic micro-organisms present, a history suggestive of syphilis was obtained, and was confirmed in both cases by the Wassermann reaction. In the fourth case of angina with a doubtful syphilitic history, in which *B. fusiformis*, *Spirochaeta buccalis*, and *Spirochaeta dentium* were present in large numbers, the sero-diagnostic test was negative.

Saverio (11), discussing "Vincent's angina and syphilis," considers, from the cases cited above, that the presence of numerous Vincent organisms in the exudation of cases of angina does not as a necessary consequence produce any deviation of complement, and that until such important problems have received sufficient light new parallel studies must be made, on the one hand to establish the pathogenic value of the spirochaetes commonly found in Vincent's angina, and, on the other hand, to accumulate sufficiently numerous cases of similar forms of angina in which the sero-diagnosis has been made. If a certain

diagnosis cannot be made, he holds that the hypothesis of Vincent's angina in syphilitic subjects can be stated as the most probable.

It is to the latter suggestion of Saverio's that we have directed our attention. At the Queen Alexandra Military Hospital we have recently had occasion to examine bacteriologically more than 300 cases of fusospirillary infection, and about half this number were typical cases of Vincent's angina verified by bacteriological findings, the results being recorded in papers read before the Odontological and Laryngological Sections of the Royal Society of Medicine, which appeared in the Proceedings of that Society for February and March, 1917 (12, 13). From this number we have taken at random, and with no more selection than mere convenience demanded, fifty-five cases, and had the blood tested by the Wassermann reaction, which was performed either by one of us (F. E. T.) by the method recently described in the *Lancet* (14), or at the laboratories of the Rochester Row Military Hospital. In all of these cases, with but two exceptions, no fixation of complement could be observed. The histories of these two cases, in which a positive Wassermann reaction was obtained, are as follows :

CASE 1.—Private C——, Australian Imperial Force, attended the laboratory on December 14, 1916, for a sore throat which had troubled him for a week. On examination a superficial ulcer was seen on the right tonsil, and the margins of both upper and lower gums were ulcerated and covered with a soft creamy exudate. The lymphatic glands at the right angle of the jaw were swollen and tender. The ulcers on the tonsil and gums bled when touched lightly, and smears from these parts when examined microscopically showed numerous fusiform bacilli and spirochaetes. The gums and tonsil were treated daily, and by December 20 the latter was quite healed. The patient continued to attend for treatment of his gums, and on December 24 a sluggish-looking ulcer was noticed on his left tonsil. Smears from this ulcer presented microscopically a typical picture of the organisms of Vincent's angina, but it was noticed that the glands at the angle of the jaw were not enlarged and the ulcer did not bleed when touched. Blood was taken for a Wassermann reaction, and was found positive. On cross-examination the patient admitted that he had contracted syphilis in Australia, having had a primary chancre ten years previously, for which he was treated successfully, remaining free from secondary symptoms and having had no further syphilitic manifestations up to date.

CASE 2.—Private J——, Australian Imperial Force, attended for a sore throat which had troubled him for a month. There was a deep ulcer filled with a yellowish-white exudate on the left tonsil, and his upper and lower gums were ulcerated. The ulcers on the tonsil and gums bled when lightly touched, and smears when examined microscopically showed the usual picture of the organisms of Vincent's angina. The lymphatic glands at the left angle of the jaw were enlarged and tender. As we were making a serological investigation of Vincent's angina at this time, a sample of the patient's blood was taken for examination, and gave a positive Wassermann reaction. The result was communicated and explained to the patient, who then admitted having had a chancre ten years ago, when he was treated by a herbalist for three months with medicine and ointment for the sore. No secondary or further symptoms of the disease have been noticed. Patient was married, but has had no children. The throat and gums were treated



on the lines we had adopted for fuso-spirillary ulcerations. The throat was healed in a week, and the gums about three weeks later. This case, from its clinical characteristics and microscopical findings, was obviously one of fuso-spirillary ulceration in a subject with latent syphilis.

These two cases then were the only ones out of a total of fifty-five cases of Vincent's angina which were examined by the Wassermann test in which the reaction was positive, the remaining fifty-three cases being quite negative. The positive character of the reaction in the two cases admits of a ready explanation, and was not due to the fuso-spirillary infection of Vincent. In both cases the condition was one of Vincent's angina in a subject of latent syphilis.

As a result of this investigation and of a careful and critical consideration of cases recorded in the literature, we have come to the conclusion that the prevailing belief in the occurrence of a positive Wassermann reaction in Vincent's angina has no foundation in fact, and that the two conditions can be differentiated with absolute certainty by the application of bacteriological and serological methods; and that when the complement-fixation test of Wassermann is positive in cases of Vincent's angina, then a double infection exists, either as a coincident syphilitic and Vincent's infection, or as the occurrence of Vincent's angina in the subject of latent syphilis.

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## INTRINSIC CANCER OF THE LARYNX AND THE OPERATION OF LARYNGO-FISSURE,

WITH A DESCRIPTION OF SOME NEW INSTRUMENTS SPECIALLY DESIGNED FOR IMPROVING THE TECHNIQUE.

BY IRWIN MOORE, M.B., C.M.EDIN.

(Continued from p. 269.)

*Removal of the Tracheotomy Tube.*—Formerly it was always the custom to retain the tracheotomy tube for from twelve to twenty-four hours, but the tendency during recent years has been to dispense with it at once after the operation, which, it must be admitted, is a distinct gain in the technique of the operation, since the patient is better able to cough up mucus or other secretions than if a tracheotomy tube is in the neck. As to whether this is advisable in every case is still a debatable point. When the tube is left in for a few hours the quiet and free respiration which follows relieves the larynx of considerable strain, and consequently there may be less risk of post-operative hæmorrhage. If it is removed and obstruction to breathing occurs through bleeding or œdema of the laryngeal tissues, it may be difficult to find the opening hurriedly and re-insert the tube, especially into the deep trachea, when a low tracheotomy has been performed. There may be trouble with breathing following excision of the growth and swelling through œdema of the arytenoid or aryepiglottic fold, which may flap about and require removal. If the surgeon is not on the spot, dangerous dyspnoea may suddenly occur, and the patient may become asphyxiated. Moure<sup>1</sup> (Bordeaux) says that no hard and fast rule can be laid down applicable to all cases. The opinion of the writer, after considerable experience of these cases, is that the tube may be permanently withdrawn in the majority of cases after operation, without much risk, whilst in a few cases its immediate removal may seriously endanger the patient's life. It is safer to retain it in those cases where a high blood-pressure is known to exist, when considerable oozing, difficult to control, has occurred during removal of the growth and is likely to recur, or where the patient is out of immediate reach of the operator.

*On the Question of Sewing up the Entire Neck Wound.*—W. G. Porter<sup>2</sup> reports the case of a female, aged fifty-nine, on whom he performed thyro-fissure for epithelioma of the larynx, preceded by a tracheotomy. On completion of the operation the tracheotomy tube was removed, and the entire skin wound closed. The patient was placed in bed in the sitting-up position. At first she was congested and coughed up fresh blood, but she gradually became quieter and the bleeding ceased. One hour later, however, a sudden attack of asphyxia occurred: the wound was quickly opened up and the tube re-inserted. The following day the tube was removed. Three days after the operation symptoms of pneumonia supervened, and the patient died on the sixth day.

He remarks that in future he would remove the tube and leave the wound open so that a tube could be easily re-inserted if necessary.

On account of the more superficial position of the trachea in the extended operative posture of the neck, as compared with that of the

<sup>1</sup> *Brit. Med. Journ.*, 1903, ii, p. 1148.

<sup>2</sup> "Report (for 1908) of the Ear and Throat Department of the Eye, Ear, and Throat Infirmary, Edinburgh," *JOURN. LARYNGOL., RHINOL., AND OTOL.*, 1910, xxv, p. 179.

normal sitting-up or lying position, if a tracheotomy tube is to be retained for twenty-four hours after operation, due allowance should be made for this difference when choosing the length of a tube. A tube which may fix accurately in the operative posture with its flange level with the skin, will, after the patient is placed back in bed be too short, and may easily slip out of the trachea into the soft tissues of the neck, causing pressure on the front of the trachea, and a condition of extreme gravity may in some cases suddenly arise, especially if any complication such as hæmorrhage or œdema of the larynx occurs. The operator may be out of reach with no one on the spot capable of dealing with the situation. A number of such cases have occurred. This can be avoided by either using a large-sized Durham's tube of, say 3 in. in length, familiarly known as the "Jumbo" (Fig. 33)—which has, however, the disadvantage of being in the way during the laryngo-fissure operation—or using a short tube for the operation and replacing it by the longer one before the patient leaves the operation-table. The replacement of a longer tracheotomy tube is recommended because, by means of the regulating screw and collar it

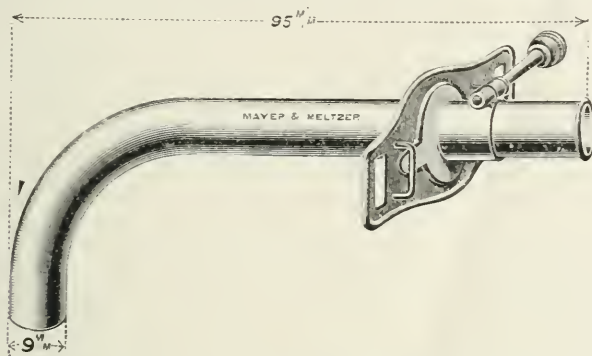


FIG. 33.—Large-sized Durham's tracheotomy tube.

may be adjusted to fit the depth of any neck: that is to say, the tube will find its own level (depth), consequently irritation of the tube extremity in the trachea is avoided. Again, since the mouth of the tube stands out well from the neck any mucus expectorated through the tube may be easily collected in loose gauze swabs by the nurse, instead of saturating the wound dressing and causing discomfort to the patient. By using these longer tubes it is practically impossible for them to slip out of the tracheal opening. The depth of the trachea from the surface in a low tracheotomy varies considerably and H. S. Birkett and A. G. Nicholls<sup>1</sup> (Montreal) report a case where unusual difficulty was met with in tracheotomy owing to the great depth of the trachea. It was found to be  $3\frac{1}{2}$  in. from the surface and an unusually long tracheal tube was required.

In view of the difficulty, which sometimes occurs, of finding the tracheal opening when a tracheotomy tube has to be hurriedly re-inserted after operation, especially where a low tracheotomy has been performed and the tracheal opening is deep down in the neck, Ingals<sup>2</sup> (Chicago)

<sup>1</sup> *Montreal Med. Journ.*, May, 1899. Abstract, *JOURN. LARYNGOL., RHINOL., AND OTOL.*, 1899, xiv, p. 430.

<sup>2</sup> "Dis. of the Chest, Throat, and Nasal Cavities," 1899, p. 423.

has made a valuable suggestion which might be made use of in these cases. If a strong ligature is passed, one through each side of the cut edges of the trachea, at the time of the preliminary tracheotomy, and the ends knotted together on each side, forming two loops, the trachea may be held open at any moment by drawing on them. After a laryngofissure is concluded and the tracheotomy tube withdrawn, these ligatures may be left in position for twenty-four hours, and if the necessity should arise of reintroducing the tube these ligatures may be made use of in place of tracheal dilators or hooks, to draw apart the tracheal incision.

If any difficulty in breathing should occur due to bleeding into, or œdema of, the larynx, the nurse, by drawing upon these strings on each side of the neck in place of a tracheal dilator, may immediately reopen the tracheal wound so that the impeded respiration may be relieved and the patient tided over until the surgeon arrives.

R. H. Woods<sup>1</sup> (Dublin) has suggested, both as a matter of precaution and as a compromise, that an ordinary bivalved tracheotomy tube should be used and left in the trachea for forty-eight hours, its opening being corked up so that the patient cannot breathe through it. Should any difficulty in respiration occur, the cork can immediately be removed.

Patients can cough and get rid of mucus more easily through the natural passage when the tracheal wound is closed, or with a bivalved tube in position when the opening is blocked, than when an ordinary tracheotomy tube is open.

In every case it is important that the operator or a skilled assistant should be within immediate call for, at least, twenty-four hours after the operation of laryngo-fissure to meet any emergency which may arise (Cohen).<sup>2</sup> A tracheotomy tube should always be at hand, and if the entire neck wound has been sutured immediately after operation, the surgeon should be prepared at a moment's notice to let go the stitches, reopen the wound, and re-insert the tube. In all cases the patient should be left in the care of the most competent nurse, and every detail should be carefully supervised by the surgeon.

*Post-operative Injection of Narcotics.*—While it is important that the patient should sleep tranquilly, it is seldom advisable to administer morphia for fear of locking up the secretions, and diminishing the normal cough reflexes which are necessary to keep the air-passages clear. It should not be forgotten that if the patient has already had an injection of morphia prior to the operation, followed by an anæsthetic, there is a natural inclination to sleep, and an element of danger may be introduced into these cases, if opium or its derivatives are recklessly given, by producing a depressing effect on the respiratory centre. If the patient is restless, with a tendency to bleed, or a frequent and irritating cough is present, morphia in small doses (gr.  $\frac{1}{6}$ ) may be indicated. Quiet, natural sleep, with the patient retaining control of the laryngeal and pharyngeal reflexes, is what should be encouraged during this stage. If a derivative of morphia such as *heroin hydrochloride* is used, great care should be taken in the dosage, since many patients are more susceptible to this preparation than morphia. Again, it is much more active in small doses than corresponding doses of morphia, being a more powerful respiratory sedative. It should be remembered that heroin is three times the strength of morphia, and the dose should be from  $\frac{1}{24}$  gr. to  $\frac{1}{6}$  gr. as compared

<sup>1</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1899, xiv, p. 185.

<sup>2</sup> *Laryngoscope*, 1907, xvii, p. 369.

with the corresponding  $\frac{1}{8}$  and  $\frac{1}{2}$  gr. morphia. If, therefore, in susceptible patients, during the post-operative stage, too large or too frequently repeated small doses of narcotics are prescribed, disastrous results may follow, through non-return or incomplete return of the cough reflex, and the patients may "drown in their own mucous secretions."

Bellamy Gardner<sup>1</sup> advises that morphia should not be given for twelve hours after the operation, because of the importance of retaining the coughing reflex, and he confirms also the importance of placing the patients back in bed in the sitting-up position in which they have the best control of their respiratory apparatus.

Hugh R. Phillips<sup>2</sup> expresses his opinion that the post-operative use of narcotics immediately after the operation ought not to be needed for some hours if the patient has had an injection previously before coming into the theatre. If none has been given, a small dose of morphia or of omnopon will usually allay the restlessness and enable the patient to remain comfortable. He says it is wiser to give a small dose and repeat if necessary, so that the cough reflex is retained.

*Post-operative Posture and After-care of Patients.*—Formerly, it was customary to keep the patient lying upon the side, near the edge of the bed, without even a pillow, and the head was not allowed to be raised for two or three days. In some cases the feet of the bed were also elevated. This was the posture recommended by Butlin<sup>3</sup> and employed by Semon, and it was expected to insure the flow of secretions towards the mouth and away from the air-passages and prevent aspiration into the lungs of septic secretions, which gave rise to many cases of pneumonia. It has been found that this position prevented the patient from coughing up easily, and encouraged passive edema of the lungs.

William Hill<sup>4</sup> says: "Butlin's posture does not, as the originator hoped it would, prevent the septic secretions going down into the lungs, and if the patient has a weak heart, there may ensue edema of the lungs, and in some of these cases death has resulted."

Since the position in which the patient is placed during the first few days is one of the main factors of success in this operation, it is interesting to note that it was Francis J. Quinlan<sup>5</sup> (New York), who first drew attention in 1909, to the importance of the sitting-up posture, which position is now employed and recommended in all patients operated on by laryngo-fissure. He states that in all cases of this kind, during the past five years (as far back as 1904), he had set up his patients in bed as soon after the operation as possible, almost in the sitting position, and kept them in this position as much as possible, and the absence of pneumonia which generally and almost invariably followed these cases was amazing.

In this position patients are much more comfortable, and have the best chance of responding to the cough reflex, the loss of which is one of the greatest dangers following the operation.

Partly in consequence of this new posture, if the operation is performed early in the morning, patients may be sitting up in bed the same evening reading the paper, out of bed the next day, and sitting in an arm-chair

<sup>1</sup> Personal communication to author.

<sup>2</sup> Personal communication to author.

<sup>3</sup> *Op. cit.*, p. 191.

<sup>4</sup> "Proc. Roy. Soc. Med.," 1917, x (Laryngol. Sect.), p. 51.

<sup>5</sup> Discussion on J. W. Gleitsmann's paper on "Laryngectomy," *New York Acad. Med.*, January 27, 1909. Abstract, *Laryngoscope*, 1909, xix, p. 304.



for two hours. The following day they may sit up for four hours, after which they may be up all day. On the fifth day they are able to go out walking for an hour, and leave the nursing home in ten days.



FIG. 34.—*Post-operative posture.* Photograph of patient, aged seventy, taken two days after having been operated on by the author, showing the sitting-up position, recommended in all cases of laryngo-fissure, since in this position there is a more ready response to the cough reflex, and septic secretions are prevented from passing down into the lungs. Patient is here seen, supported by a bed-rest and pillows, reading a newspaper.

Patients are not allowed to speak for at least three weeks, and then only in a whisper, gradually increasing until the voice becomes stronger.

Chevalier Jackson<sup>1</sup> allows patients to ask for any requirements three or four times a day in order to give slight exercise to the laryngeal motor

<sup>1</sup> "Peroral Endoscopy," 1915, p. 667.

mechanism. He considers that slight vocal effort prevents stiffening of the arytenoid joints.

Difficulty in swallowing, as previously stated, only occurs in those cases where the upper larynx has been injured very much, or where a large part of the arytenoid has been removed, and for a time food may have to be given through a nasal tube to prevent its entering the larynx.

Formerly, when patients were kept on their back and fed by the mouth, food was very apt to get down into the lungs and set up septic trouble, and many patients consequently died.

Butlin and Semon<sup>1</sup> fed their cases for the first or second day by the mouth, the patient lying with the head hanging slightly over the edge of the bed. Food was taken from a feeder, the nozzle of which was introduced into the dependent angle of the mouth. They say that no patient was lost from septic pneumonia which could be traced to that method.

Chevalier Jackson<sup>2</sup> places his patients on their back for the first forty-eight hours, with sand-pillows on each side of the head to keep it straight in the middle line, so that the approximation of the thyroid cartilages may not be displaced.

As a result of improved operative technique with its reduced traumatism, together with post-operative posture, it is found that patients can now swallow liquids easily the same day. Only sterile water should be given at first in order to see how they can swallow. The patients should lean forward in bed with the head well forward, so that if they cannot swallow properly, and any fluids escape into the larynx, it may run out through the wound in the neck and not pass into the air-passages.

Patients can generally swallow liquids and jellies the next day and solid food on the third day. It is advisable for the first three days that all food should be sterilised.

*Extirpation by the Endo-laryngeal Route.*—Since it is agreed that the successful extirpation of even the smallest growth depends upon free removal along with an area of healthy surrounding tissue, and it has been repeatedly shown, on opening the larynx, that the disease is more extensive and advanced than was previously suspected by laryngoscopic examination (Figs. 28 and 29), it is obvious that the endo-laryngeal route can never be efficient, and must always leave one in doubt as to whether the entire malignant deposit has been completely removed or not.

Finder<sup>3</sup> (Berlin) considers that there is still a place for the endo-laryngeal removal of cancerous growth in certain very rare and carefully selected cases, and he refers to two cases—one where the patient remained free from recurrence for three years, and another where the growth reappeared after eighteen years.

A few isolated cases have also been reported by Sendziak<sup>4</sup> (Warsaw), Fraenkel<sup>5</sup> (Berlin), Ingals<sup>6</sup> (Chicago), StClair Thomson,<sup>7</sup> Berens<sup>8</sup> (New York), and others, where the growth has been entirely removed by the endo-laryngeal route, and no recurrence has taken place; but these were undoubtedly growths of superficial and limited extent, which were either

<sup>1</sup> "Trans. Med. Soc. Lond.," 1907; xxx, p. 140.

<sup>2</sup> *Op. cit.*, p. 667.

<sup>3</sup> JOURN. LARYNGOL., RHINOL., AND OTOL., 1910, xxv, p. 602.

<sup>4</sup> New York Med. Journ., November 30, 1907.

<sup>5</sup> Deut. med. Woch., xv, 1889; also Arch. f. Laryngol., vi, ii, 1897.

<sup>6</sup> Laryngoscope, 1907, xvii, p. 370.

<sup>7</sup> "Intrinsic Cancer of the Larynx—Complete Excision apparently effected by Endo-laryngeal Operation," Trans. Amer. Laryngol. Assoc., 1914, p. 34.

<sup>8</sup> Laryngoscope, 1910, xx, p. 984.

localised to the edge of the cord or projected from the surface into the larynx. It is impossible to be successful where infiltration extends beyond the superficial tissues.

Arslan<sup>1</sup> (Padua) summarised reports of successful endo-laryngeal operations, sixteen in all, including two of his own, with freedom from recurrence lasting for twenty years.

Sendziack,<sup>2</sup> in 1907, stated that 50 per cent. of cases of laryngeal cancer were cured by laryngo-fissure compared with 46 per cent. by the endo-laryngeal method. He says that when recurrences were taken into account it would be found that 22 per cent. of the cases recurred after laryngo-fissure, 30 per cent. after partial or unilateral resection, and 33 per cent. after endo-laryngeal operations. This percentage of endo-laryngeal cures is, however, not supported by the statistics of other observers.

Chevalier Jackson<sup>3</sup> says endo-laryngeal operation is contra-indicated, except in minute growths limited to the tip of the epiglottis, which are not strictly endo-laryngeal.

One great advantage of fissure of the larynx is that information may be obtained through direct inspection and palpation of the growth, which is not possible by the endo-laryngeal route, and there is no doubt whatever that this operation should be performed more frequently for exploratory purposes in doubtful cases, and it may be made the first stage of hemilaryngectomy or laryngectomy if permission has first been obtained from the patient to continue the operation if the growth is considered to be malignant. If the naked eye appearances are in favour of malignancy, or if there is any serious question of doubt, it should be made an invariable rule to go on with the operation.

*Removal by Suspension Laryngoscopy.*—Clyde Lynch<sup>4</sup> (New Orleans) refers to the removal of intrinsic epithelioma of the larynx by means of suspension laryngoscopy, and states that his experience has been exceptionally good, but that it is not large enough to reach definite conclusions. He says, "dissection under suspension is not difficult, and can be done without permitting an instrument to touch the tumour mass." This procedure by endo-laryngeal removal must, however, be condemned for the reasons previously stated.

*Result of the Operation as regards Recrudescence or Recurrence.*—Whilst malignant disease of the "extrinsic" variety presents early and extensive metastases involving the adjoining lymphatics; in the "intrinsic" variety the disease at first remains a local one owing to being surrounded by a "cartilaginous box" from which the intrinsic lymphatics have a poor connection with the neighbouring glands in the neck.

Carcinoma of the vocal cord grows chiefly in a direction parallel to the long axis of the cord, which it tends to involve completely, or to a very large extent, before it encroaches on surrounding parts. This characteristic method of growth being due to the arrangement of the submucous lymphatic space of the cord, which forms a closed sac, the boundaries of which separate it from the ventricles of Morgagni and the lymphatic spaces of the subglottic mucosa. (Blumenfeld.)<sup>5</sup>

<sup>1</sup> *Archiv. Italiano di Otologia*, 1901, xii.

<sup>2</sup> *New York Med. Journ.*, November 30, 1907: "Med. Annual," 1909, p. 401.

<sup>3</sup> *Op. cit.*, 1915, p. 438.

<sup>4</sup> "A Résumé of my Year's Work with Suspension Laryngoscopy." *Ann. Otol., Rhinol., and Laryngol.*, 1917, xxvi, p. 308.

<sup>5</sup> Blumenfeld, F. (Wiesbaden), "On the Pathological Anatomy of the Vocal Cord," *Zeitschr. f. Laryngol.*, vol. iii, part iii. Abstract, *JOURN. LARYNGOL., RHINOL., AND OTOL.*, 1910, xxv, p. 668.

For these reasons the prognosis of intrinsic cancer of the larynx is, perhaps, more favourable than that of malignant disease in almost any other region of the body (Knight),<sup>1</sup> but this depends on early diagnosis, early radical operation, and greater care in the selection of suitable cases for this special operation.

Brewer,<sup>2</sup> Geo. E. (New York), says: "Not one authentic case of carcinoma of the larynx was ever cured, except by early surgical removal of the disease."

Recurrence is likely to take place when the operation has not been thoroughly performed, and the removal of the disease has been only partial.

Some cases of recurrence are probably due to the reinfection of diseased cells, hence the importance of not cutting into or tearing the growth during removal.

Chevalier Jackson<sup>3</sup> considers there is a sound basis for the opinion that recurrences in the scar are due to wound infection at the time of operation quite as often as incomplete removal, they are therefore recrudescences, not true recurrences.

The greatest cause of non-success in the past has been the lack of attention to technique, and the steady improvement in results during recent years is undoubtedly due to a better understanding of the operative work and to the perfection of details, especially of those concerned with the after-care of the patient, by which the prevention of pneumonia—a frequent cause of death in the past—is now assured.

As Delavan<sup>4</sup> remarks, "improved technique, the special skill and experience of the specialist, the early recognition of laryngeal cancer by the general practitioners, and its prompt treatment are sure to give the best results." However skilful and thorough the operator, the microscope may show that a small piece of the growth has been overlooked beyond the line of excision and left behind, especially posteriorly or in the sub-glottic region, recognised microscopically by the fact that the excision has passed through malignant growth and that the necessary margin of healthy tissue beyond the growth is not present.

If there should be any doubt as to complete removal the operator must not hesitate to reopen the larynx without delay and remove a further piece.

StClair Thomson<sup>5</sup> has performed a second laryngo-fissure under such circumstances on a patient, aged seventy, with a blood-pressure of 200—within ten days of the first operation—resulting in a complete and rapid recovery.

Semon's<sup>6</sup> experience showed that no recrudescence may be feared if patient has remained well for a full year after the operation. He also thinks that the word "cure" can safely be employed unless recurrence takes place within one year of the operation.

The first year has been well described by StClair Thomson<sup>7</sup> as the "year of probation," and is the most anxious time, especially the first three months. His experience confirms Semon's opinion, but he is some-

<sup>1</sup> "Trans. Amer. Laryngol. Assoc.," 1904, p. 173.

<sup>2</sup> *Laryngoscope*, 1909, xix, p. 601.

<sup>3</sup> *Op. cit.*, 1915, p. 665.

<sup>4</sup> *Med. Record*, 1904, lxvi, p. 446.

<sup>5</sup> "Proc. Roy. Soc. Med.," 1915, viii (Laryngol. Sect.), p. 35.

<sup>6</sup> *Laryngoscope*, 1903, xiii, pp. 833 and 887.

<sup>7</sup> *The Lancet*, 1914, i, p. 300; "Proc. Roy. Soc. Med.," 1916, ix (Laryngol. Sect.), p. 8.



what more cautious when he says that if recurrence does not take place during the first year after operation there is "every prospect of permanent cure," also that if cases come back with disease within a year we may conclude that there has been incomplete removal, if after that date it is a recurrence.

Delavan<sup>1</sup> considers that since recurrence may take place years after the removal of the growth, no limit of time can be fixed beyond which there will be an absolute certainty of permanent immunity from relapse. One-half and in some instances two-thirds of the patients reported alive at the end of the first year have died within three years. He thinks that the expression "permanent cure" should be used with care and that three years should be generally considered the minimum allowance of time in which to record a case as one of actual or permanent cure. Statistics based upon alleged cases of less than three years' duration are, therefore, in his opinion worthless.

Because there may be no recrudescence or recurrence of cancer within two or three years of operation Tilley<sup>2</sup> thinks it is not wise to speak of a "cure." He says that amongst his cases of operation for malignant disease of the vocal cords by laryngo-fissure he has had recurrence in two, five, six, seven, nine, thirteen, and fifteen years after the primary operation. The last was one Semon<sup>3</sup> had operated on fifteen years previously, and it ended fatally. On the other hand, he has operated<sup>4</sup> in early intrinsic cases on patients who are still alive, ten, nine, six, four, and three years following the operation.

Since one can never promise a lasting cure it is best that this term should not be used. The recurrence of the disease may not always be at the same site as shown by a case referred to by Tilley<sup>5</sup> where re-growth occurred in the other cord nine years after the primary operation, but both these cases were probably not a true recurrence, and might be considered as a fresh attack.

Amongst his list of recurrences he refers<sup>6</sup> to a case in which the patient died from asphyxia thirteen years after the primary operation. *Post-mortem* examination of the larynx showed the scar of the old operation perfectly healthy, but there was a well-defined and typical epithelioma in the opposite and formerly healthy cord (Fig. 35).

Though recurrence may not take place in the larynx secondary developments may occasionally occur in other parts of the body.

H. S. Birkett and A. G. Nicholls<sup>7</sup> (Montreal) record a case of carcinoma of the larynx where four or five secondary nodules were found *post-mortem* in the liver. The carcinoma was confined to the left vocal cord and had not apparently extended outside the laryngeal cavity.

StClair Thomson<sup>8</sup> reports a case where laryngo-fissure was performed and later excision of the larynx. Examination of the larynx showed that the growth had been completely removed by the previous operation, yet five and a half years later there was recurrence in the glands of the neck,

<sup>1</sup> "Trans. Amer. Laryngol. Assoc.," 1904, p. 155.

<sup>2</sup> "Proc. Roy. Soc. Med.," 1916, ix, pp. 7 and 48.

<sup>3</sup> *Ibid.*, 1910, iii, p. 33.

<sup>4</sup> "Dis. of the Nose and Throat," 1918, p. 616.

<sup>5</sup> "Proc. Roy. Soc. Med.," 1915, viii, p. 36.

<sup>6</sup> *Op. cit.*, p. 616.

<sup>7</sup> *Montreal Med. Journ.*, May, 1899. Abstract, *JOURN. LARYNGOL., RHINOL., AND OTOL.*, 1899, xiv, p. 430.

<sup>8</sup> "Proc. Roy. Soc. Med.," 1917, x (Laryngol. Sect.), p. 20. Also, *Brit. Med. Journ.*, 1912, i, p. 355.

without any recurrence in the throat. Also another case,<sup>1</sup> in which there was recurrence at the base of the tongue on the opposite side, yet, as he remarks, "there is but little direct lymphatic connection between the two sites, viz. the right cord and the opposite lingual tonsil."

An apparent regrowth about the anterior commissure sometimes causes anxiety during the first few months of convalescence, but in the great majority of cases may consist of simply granulation tissue. One should, therefore, not be alarmed and directly proceed to a second operation, as has occasionally been done in the belief that there was a true recurrence. These granulomata are more pedunculated or semi-pedunculated than the original growth, and may occur either in the scar of the former growth, or the anterior commissure of the vocal cord. In former days they were frequently found round the stitch when this was passed

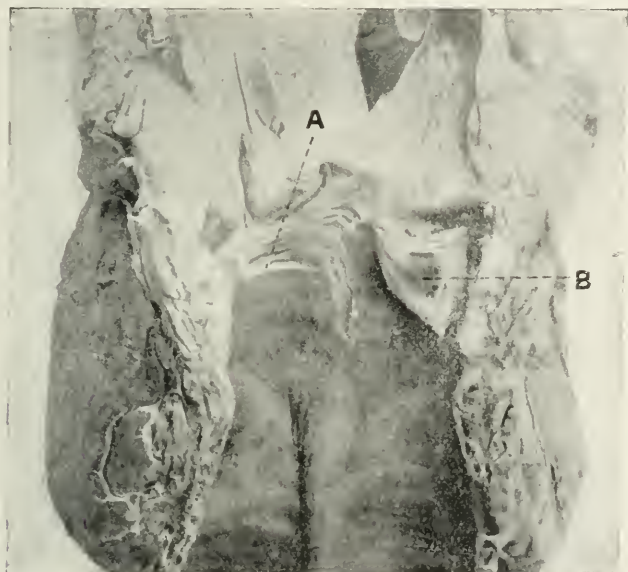


FIG. 35.—*Epithelioma of the Larynx*. A, Healthy scar of operation on right vocal cord; B, Recurrence (or re-deposit) of epithelioma on left vocal cord, thirteen years after removal of opposite cord, for the same disease. (By kind permission of Mr. Herbert Tilley, from "Diseases of the Nose and Throat," 4th edition, 1918.)

through the thyroid cartilage at the anterior commissure. They can be successfully removed by forceps either indirectly or endoscopically and will probably prove to be only fibrous tissue. A second or even a third recurrence may follow, and require removal by forceps.

*Result of Operation as regards Voice.*—This operation if carefully performed without injury to the soft parts only interferes with function to a minimum extent, and usually results in a slightly hoarse but excellent voice, nearly as good as normal. After removal of a vocal cord, its place is taken by a cicatricial ridge, and it is extraordinary what good service this is capable of. For example, Semou<sup>2</sup> showed at the Royal

<sup>1</sup> "Proc. Roy. Soc. Med.," 1916, ix, p. 8.

<sup>2</sup> *Ibid.*, 1909, ii (Laryngol. Sect.), p. 79.

Society of Medicine in 1909 a man, aged forty-five, from whom he had removed an entire cord six months previously, and who was then able to sing with a clear voice. A case has also been reported<sup>1</sup> by Tilly where patient, a solicitor, was able to address even company meetings, whilst in another case,<sup>2</sup> referred to by StClair Thomson, patient was able to resume his profession as a schoolmaster.

Chiari<sup>3</sup> reports a case where the patient delivered a course of scientific lectures for a year after the operation, and one where he had removed both vocal and ventricular bands in three thyrotomies, yet patient could, after seven years, speak quite loud and could be understood.

Swain<sup>4</sup> (New Haven, Conn.) records a case where, six months after operation, a minister had enough voice to preach again. In one case reported both vocal cords were completely removed, yet the patient had a loud, strong, though harsh voice.

In another, all the left vocal cord and soft tissue in left of the larynx was removed, as also the right vocal cord up to the processus vocalis, yet patient could speak easily and loudly with a strong, harsh voice, which was apparently produced by the vibration of the aryepiglottic folds.

In some cases a course of exercises for the re-education of the voice may be considered necessary and helpful in improving and strengthening the voice.

Lack<sup>5</sup> has described and summarised the difficulties of the laryngofissure operation as mainly due to the fact that "splitting the thyroid cartilage and pulling aside the two halves with retractors gives a very poor view of the interior of the larynx; that with this opening there is great difficulty in manipulating forceps and cutting instruments, also in defining the limits of the growth and removing it thoroughly." He goes on to say that in thyro-fissure to obtain sufficient access it is often necessary to divide the thyrohyoid membrane and "to pull the two halves of the larynx forcibly apart"; in consequence, the patient after the operation may have "difficulty in swallowing." Also, that after thyro-fissure there is often "considerable pain for some days," due probably to the "wrenching apart" and "bruising of the tissues," from the prolonged retraction. He therefore suggests in all cases that the difficulties are best overcome by resecting a portion of the healthy cartilage underlying the growth in one piece together with the growth, either by means of a preliminary thyro-fissure or by a preliminary removal of the cartilage before fissure. In the first case it is evident that this constitutes a further stage of thyro-fissure, and should be considered under the category of sub-hemi-laryngectomy, whilst in the second case the objections are that the extent of the disease cannot be ascertained as by thyro-fissure, whilst re-infection by cell transplantation (the risks of which have been acknowledged by Lack) is more likely to occur through breaking into the growth whilst reflecting the cartilage if the disease has passed beyond the perichondrium and attacked the cartilage.

<sup>1</sup> "Proc. Roy. Soc. Med.," 1914, vii (Laryngol. Sect.), p. 192.

<sup>2</sup> *Ibid.*, 1910, iii (Clin. Sect.), p. 117.

<sup>3</sup> "Trans. Amer. Laryngol. Soc.," 1909, p. 22.

<sup>4</sup> Discussion on Delavan's paper, "Recent Advances in the Treatment of Malignant Disease of the Larynx," "Trans. Amer. Laryngol. Assoc.," 1904, p. 168.

<sup>5</sup> See *The Lancet*, 1896, vol. i, p. 1638. "Partial Excision of the Thyroid Cartilage as an Alternative to Thyrotomy in Malignant Disease of the Vocal Cords," "Proc. Roy. Soc. Med." (Laryngol. Sect.), 1916, vol. ix, p. 62. "Partial Resection or Window Resection of the Larynx for Intrinsic Malignant Disease," JOURN. OF LARYNGOL., RHINOL., AND OTOL., 1916, vol. xxxi, pp. 121-128.

The chief object, however, of the operation of thyro-fissure is thoroughly to remove the growth with as little destruction of the larynx as will, so far as possible, ensure complete eradication of the disease, while at the same time leaving the patient with a serviceable voice. Since the removal of a large portion of the healthy cartilaginous framework may lead to narrowing and possibly stenosis of the larynx, with consequent impairment of voice (this is not, however, admitted by Lack), it should be our main endeavour to save rather than destroy, compatible with safety, the healthy surrounding parts.

Butlin<sup>1</sup> found that cartilage, whether calcified or not, was peculiarly resistant to the progress of cancer, and that it was the perichondrium which was affected, and only in the rarest instances was the cartilage itself infiltrated. He emphasised the point that "intrinsic cancer of the larynx involves the framework of the larynx with difficulty, so that even when it is seated almost on the surface of the cartilage it is seldom necessary to do more than cut away the face of the cartilage."

The removal of any diseased cartilage underlying the growth has always been carried out in the past, and this constitutes one of the great advantages of thyro-fissure, in that, if the disease is found to be advanced, the operation can always be carried a stage further and a partial hemilaryngectomy performed.

The question has arisen lately as to whether the voice is better after removal of a portion of the thyroid ala than when the cartilage is left as in the operation above described. Comparison of cases in the future will doubtless decide this point. So far no appreciative difference has been observed by the writer between those cases in which the new vibratory band is formed from the perichondrium and soft parts covering the external surface of the thyroid cartilage, and that formed from cicatricial tissue within the larynx when the cartilage is left, nor does there appear to be any justification, from this point of view, for the unnecessary sacrifice of healthy cartilage.

Lack's suggestion of "window resecting," if performed only in advanced cases of endo-laryngeal cancer which have passed the ideal stage of thyro-fissure, and if preceded by a preliminary fissure, should prove of great value in the fact that it retains the framework of the larynx and avoids the risks and disadvantages of hemilaryngectomy; but it can never take the place of thyro-fissure, and should not be considered under that heading.

Improvements in technique and the application of more suitable and efficient instruments have resulted in the difficulties enumerated by Lack being overcome.

The operation of laryngo-fissure as now carried out is greatly simplified, the more thorough removal of the disease can be more easily assured, and the risk to life from so-called recurrence, which usually implies imperfect removal, reduced to a minimum.

The illustrations were drawn for me by Mr. Thornton Shiells from special dissections prepared to show the steps of the operation and the advantage of the instruments employed. The instruments are made to my design by Messrs. Mayer and Meltzer, of Great Portland Street, W. I am much indebted to Mr. Powell, sub-librarian of the Royal Society of Medicine, for valuable assistance in compiling and verifying the references.

<sup>1</sup> "The Operative Surgery of Malignant Diseases," 1900, p. 191. Quoted by Jacobson, "Operations of Surgery," 1879, p. 420.



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## RAPID LATERAL VERSION OF THE PATIENT IN TONSIL AND ADENOID OPERATIONS.

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It is of considerable advantage in operations such as removal of tonsils and adenoids to be able to quickly rotate the patient on the side so as to empty the mouth of blood. A method which facilitates this manœuvre is presently described. With children, rotation may be effected by a

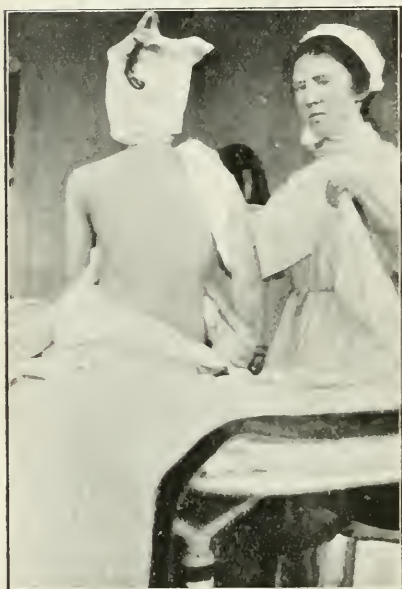


FIG. 1.



FIG. 2.

single towel, which is folded upon itself to make a band 6 in. wide. The method of application is illustrated in the photographs. One end of the towel is passed round the outer side of the right arm, and then tucked through the axilla and brought up behind as illustrated (Fig. 1); the other end traverses the back and passes round the outer side of the left arm (Fig. 2), and then is usually held by a nurse standing behind the surgeon operating. Rotation is very quickly achieved by a combined partial lift and pull over (Fig. 3). The towel automatically tightens on and fixes the right arm, and, if brought over the chest, enables the nurse or operator to control both arms should the child prove fractious during induction of anæsthesia. The head should always be steadied during the rotation manœuvre by the anæsthetist.

The method has been used by me for the last four years and has proved to be of considerable service, especially in cases where no nurse

is available. For adults, a roller towel is always used and applied as shown in the illustration (Fig. 4). I find it better in the adult cases to



FIG. 3.



FIG. 4.

steady the right shoulder with the left hand and then pull them over. The amount of leverage the towel affords is astonishing, and incidentally it has given my orderly great assistance in rolling over the muscularly-developed subjects met with in a military hospital during tonsillectomies.



**SARCOMA OF THE TONSIL.**

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SARCOMA of the tonsil is a rare disease. It is considerably rarer than carcinoma of the same region, and probably few laryngologists see more than two or three cases in the course of a lifetime, so that the following examples would appear to be worth recording.

The first case, unfortunately too advanced for successful operative treatment, came under my own notice. The second and third cases, which illustrate the good results of early surgical interference, were under the care of Dr. Logan Turner, to whom I am indebted for his kind permission to record them for the first time.

In addition to those three cases, I find that seventy-seven examples of sarcoma of the tonsil have been recorded in literature, and from the total information supplied by the eighty cases certain definite facts emerge.

CASE I.—D. W.—, a healthy, well-built man, aged fifty-four, a marine engineer, had just returned from the Baltic, where he had been employed since the outbreak of war. Apart from typhoid in 1895, he had had no illness, and he was a teetotaler and non-smoker. Two months ago he felt a sensation in the back of his throat "as if there was a bit of skin flapping about." He also noticed that his food seemed to stick in his throat and cause spasms of coughing. On looking into his throat he saw a large, red swelling on the right side. He then consulted a doctor in Petrograd, who lanced the swelling and prescribed a gargle. Up to this time there was no pain in the throat, but since then there has been some discomfort, not amounting to actual pain. The swelling gradually increased in size, and a month ago there was some bleeding from the throat, amounting to about half a teacupful of blood. He then came home to Leith to seek further advice, and consulted Dr. H. G. Langwill, who referred him to the Royal Infirmary, where I saw him on August 9, 1917, in the absence of Dr. J. M. Farquharson. He complained of a sensation of swelling in the throat, of slight pain on swallowing, and slight shortness of breath. He had been getting thinner lately, but felt quite fit.

Occupying the site of the right tonsil was a swelling about the size of a bantam's egg. Its surface was lobulated, irregular, and fissured, and of a purplish colour. It was covered with sticky mucus, but showed nowhere any ulceration. The lower pole resembled a greatly enlarged tonsil. The anterior pillar was stretched over the growth; the uvula was pushed across the middle line to the left side. There appeared to be some invasion of the posterior pillar and posterior pharyngeal wall. The swelling was soft and painless on palpation. An enlarged gland or smallness of enlarged glands was palpable behind the angle of the jaw.

The patient was admitted to hospital, and five teeth, affected with pyorrhœa, were removed, rendering the jaws edentulous. A piece of the growth, removed for examination, presented the appearance of a large round-celled sarcoma. In view of the good general condition of the patient it was decided to attempt operative treatment.

On August 16, 1917, after preliminary tracheotomy, the whole tonsillar mass was removed by enucleation, with scissors and snare under chloroform anaesthesia. The tissue was very friable, and bleeding was considerable. This was arrested by several deep catgut stitches. The tumour shelled out readily except at the posterior part, where it evidently had spread beyond the capsule of the tonsil.

The cavity granulated and healed rapidly and the tracheotomy tube was removed in a few days. The patient was then transferred to the care of Mr. J. M. Graham, who did an extensive removal of the glands in the neck. These proved to be of a sarcomatous nature, showing a large-celled growth, the cells having an alveolar arrangement similar to that found in the primary tumour.

Unfortunately, the disease recurred in the tonsil within two months of the operation, and rapidly spread across the middle line, leaving little airway, so that tracheotomy had to be re-established.

CASE 2.—G. D —, aged forty-four, was sent to see Dr. Logan Turner at the Royal Infirmary by Dr. James Wilson on November 19, 1912. He had previously had several attacks of tonsillitis, but not lately. Six weeks ago he felt a little discomfort on the left side of the throat, and this uneasiness has increased, without any actual pain. Lately he has had slight difficulty in swallowing, and his speech has become "throaty." The left tonsil is very large, and projects to the mesial plane of the fauces and downwards behind the tongue, necessitating firm pressure on the dorsum to bring into view the lower pole. The tonsil is not inflamed; it is movable; it is not adherent to the pillars, and there is no projection of the soft palate from any enlargement or pushing up of the upper pole. On the mesial aspect, about the middle, there is a shallow ulceration the size of a sixpence with a thin secretion upon it. The edges are not thickened. No glands can be palpated in the neck. A piece of the tonsil at the edge of the ulcer was punched out for microscopic examination, when it was found to be a large round-celled sarcoma.

On December 11, 1912, the tonsil was completely enucleated with scissors and snare under local anaesthesia. It presented no adhesions to surrounding parts, and removal was easy.

December 23, 1917: The patient reported by request. He has remained well since the operation, and the throat looks healthy. There is a clean cavity between the pillars on the left side.

CASE 3.—G. M —, a grocer, aged nineteen, was referred to the Royal Infirmary by Dr. Christie Forbes, and was seen by Dr. Logan Turner on July 9, 1912. For the past two months, he said, he had had "a feeling of thickness and roughness" in his throat. There was no history of pain or previous sore throat. Lately there had been slight difficulty in swallowing, and the speech was becoming thick.

Occupying the left tonsillar region and invading the posterior pillar there was a swelling, slightly uneven on the surface, but covered with smooth mucous membrane of pink appearance, though in one or two areas it was of a paler hue. The swelling projected slightly into the soft palate (supra-tonsillar region). It presented an encapsuled appearance, and was firm to the touch, though not hard.

Under local anaesthesia the growth was dissected out with scissors and snare. There were no adhesions, and removal was easy. Examined microscopically, the growth proved to be a large-celled sarcoma.

On November 1, 1912, the patient reported himself by request, feeling perfectly well. The left tonsillar fossa is free, with the exception of a small strip of tonsil tissue. One can palpate the tonsillar gland, but this gland is palpable on the right side also.

In December, 1917, in reply to an inquiry, the patient wrote to say that he was serving in the Army and that his throat had given him no trouble since the operation.

The records of cases previously reported are somewhat difficult to sift, as the majority of writings treat also of carcinoma, under the general heading "Malignant Disease of the Tonsil." The seventy-seven cases, however, on which the following conclusions are based, were those in which the growth was proved by the microscope to be of a sarcomatous nature.

(1) *The Age and Sex Incidence*, as evidenced by seventy-five cases in reports in which these data were given, may be conveniently noted in tabular form.

TABLE.—*Age and Sex Incidence.*

Ages.	1-10.	10-20.	20-30.	30-40.	40-50.	50-60.	60-70.	70-80.	80-90.
Males.	2	5	5	8	8	14	4	4	0
Females	0	2	2	5	2	9	2	2	1
Total	2	7	7	13	10	23	6	6	1

It will be seen that fifty cases were males, twenty-five were females, the disease being apparently twice as common in men as in women. The decade 50-60 gave the largest number in both sexes, the extremes of age being two years and eighty-five years.

(2) *Diagnosis*.—As a rule, the patient comes complaining of a lump in his throat, which in the early stages of the disease gives him no pain. In almost all the recorded cases the disease was unilateral, or had been so to begin with. Indeed, it would appear that it remained for a time confined to the tonsil, the capsule of the tumour being identical with the capsule of the tonsil. At this stage it may be readily and completely removed, the glands being as yet unaffected. "Thick" speech is another early symptom.

If the growth affects the upper pole of the tonsil it may cause swelling of the palate, which is liable to be mistaken for quinsy. Indeed, this mistake occurred in a considerable number of the cases. A comparatively painless "quinsy," of several weeks' duration, should always be viewed with suspicion.

Well-marked dysphagia, difficulty of breathing, pain, and hæmorrhage are later symptoms, usually appearing only at a time when the case is beyond the reach of surgery.

(3) *Treatment*.—In thirty cases the disease was too far advanced for operation. For those, and for some which recovered after operation, various palliatives were tried, such as Coley's toxins, ligature of external carotid artery, X rays, arsenic internally; after all of which temporary improvement has been noted.

Operation was undertaken in forty-eight cases, the method consisting in external pharyngotomy with division of the lower jaw (an operation devised by Mikulicz and improved by Vohsen) in twenty-one cases, and in enucleation of the tonsil by dissection, through the mouth, in twenty-seven cases. Glands were removed at the same operation or subsequently, and in many cases a preliminary tracheotomy was performed.

(4) *Prognosis*.—Thirty-three of the cases were traced subsequent to operation. Only ten remained free from recurrence, four of the patients being alive and well three months after operation, while six were known to have survived for a year or more.

With regard to those six survivors, the operation had been external pharyngotomy in three, who remained well and free from recurrence for one year (Ridley), two years (Richardson), and two and a half years (Park). Enucleation was practised in three cases, with a good result, when seen after four years (Newman), and five years (Logan Turner)—viz. the two cases above reported.

#### REFERENCES.

- (1) NEWMAN.—*Internat. Journ. Med. Sci.*, 1892.
- (2) LANPHEAR.—*New York Med. Journ.*, 1895.
- (3) WALKER DOWNIE.—*Glasgow Med. Journ.*, 1900, 1902, and 1906.
- (4) RIDLEY.—*Northumberland and Durham Med. Journ.*, 1903.
- (5) VOHSEN.—*Ann. of Otol., Rhinit., and Laryngol.*, 1909.
- (6) JACOBSON.—*Ann. of Surgery*, 1901.
- (7) BERRY.—*Boston Med. and Surg. Journ.*, 1912.
- (8) MATHEWS.—*Laryngoscope*, 1912.
- (9) TROTTER.—*Lancet*, 1913.

## SOCIETIES' PROCEEDINGS.

### ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

May 4, 1917.

President: Mr. T. MARK HOVELL.

(Continued from p. 284.)

**Syphilitic Disease (Gumma) of the Larynx, treated by Tracheotomy and Galyl Injections, complicated by Arsenical Poisoning; Recovery.—Irwin Moore.**—This patient, a female, aged thirty-nine, was shown at the meeting of the Section on December 3, 1915, and April 7, 1916—a complete history appearing in the *Proceedings*<sup>1</sup> of the latter date. She complained of hoarseness for two months. There was very marked swelling of the left aryepiglottic fold and ventricular band, and the left vocal cord was fixed in the cadaveric position. Perichondritis of the larynx was also present. There was no history of syphilis and the possibility of malignant disease was at first considered.

On account of progressive stridor, tracheotomy was performed on March 1, 1916. Three days later the Wassermann reaction was found to be positive. An intravenous injection of galyl was given on March 22 and a second on May 2. Following this injection the patient suffered severely for five days from arsenical poisoning, manifested by the following symptoms: Intense headaches and pains all over the body, severe paroxysms of colic, vomiting, watery diarrhoea, muscular tremors, suppression of urine, diminution of vision, and temporary attacks of blindness with dilatation of pupils, paresis of extensor muscles of forearms and dropped wrist, great tenderness on pressure of muscles of forearms. She lay curled up in bed resenting interference, drowsy and at times comatose. As a result of the galyl injections, she soon improved, and the tracheotomy tube was removed on July 7—four months after insertion.

A comparison of the state of the larynx on April 6, 1916, and the present condition (as seen by the drawings exhibited) shows very great improvement. The swelling has considerably diminished, the glottic space is more open. The left vocal cord is now fully exposed, but fixation is still complete. Breathing is quite free, and there has been no recurrence of stridor. The patient is greatly improved in health.

Slight discharge still continues from the tracheotomy wound; this is probably caused by infiltration of the thyroid isthmus—caseous nodules having been observed during the tracheotomy.

The special interest of this case lies in the fact that a well-defined, circumscribed gumma of the larynx is uncommon, and is generally followed by ulceration, but this did not occur, probably as a result of the galyl treatment.

Dr. JOHNSON HORNE: Is it worth while to run the risk of the symptoms that follow this treatment when excellent results are obtained by simply using iodide of potassium and mercury?

<sup>1</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxxi, pp. 148, 393.



The PRESIDENT: Not long ago, I was asked to see a case of severe ulceration of the throat. The patient was under a surgeon in London and a general practitioner in the country. After seeing the case, I wrote and suggested the patient should have 10-gr. doses of iodide of potassium and—what is often omitted, though well known to our forefathers—opium, and another old-fashioned remedy, sarsaparilla. After taking it about two days, the patient came to London to have his first injection of galyl. After that, he continued to take the medicine, and when he came up for another galyl injection, the surgeon said he had never seen such a wonderful result from one injection. Of course, the improvement was due to the iodide of potassium *plus* the opium and sarsaparilla. The value of opium in the treatment of severe syphilitic ulceration appears to be somewhat forgotten by the present generation.

Dr. DONELAN: A suppository method of injecting salvarsan has been introduced by Allen and Hanbury. As it takes six suppositories to equal one dose of salvarsan, the treatment can be conveniently varied. In one case when we repeated the series of six, as the patient had been taking arsenic as a corrective of the iodide of potassium, he developed an intense arsenical rash. These suppositories have yielded excellent effects. I do not think tertiary manifestations can be adequately treated without mercury. There is often a tendency to use iodide of potassium alone.

The PRESIDENT: I have known 1-gr. doses of iodide of potassium act beneficially when larger doses produced unpleasant symptoms.

Dr. IRWIN MOORE (in reply): When I first saw this patient I treated her with potassium iodide and liquor hydrarg. perchlor., but it did not suit her, and she got oedema of the larynx. She had a large circumscribed gumma, causing stridor, for which tracheotomy was necessary. Recently I have tried to get the thickening, which remains, further reduced by again giving potassium iodide and mercury, but patient cannot tolerate potassium iodide except in  $2\frac{1}{2}$ -gr. doses. At the time I used the galyl there were some samples on the market which were not good in some way—the powder would not dissolve properly—and as a result of my calling attention to it, the agents in London investigated the matter. The instructions supplied by the makers, in their circular, to use a concentrated solution of 10 c.c., is very dangerous, and I have no doubt was the cause of the poisoning in this case. It should not be injected in this strength, but diluted up to at least 20 c.c. with normal saline.

*Postscript.*—The discharging sinus has now healed as a result of treatment by chromic acid.

**Nasal Fibroma (of the Right Fossa) with Specimen and Microscopic Section.**—L. H. Pegler.—The patient, a man aged sixty, is exhibited one month after removal of the growth by forceps and snare intrauasally; the stump being left for the present to show its place of origin from the lower border and septal aspects of the middle turbinate, and also the firm, non-oedematous character of its tissue. The tumour was visible for some time as a smooth, round body projecting slightly below the right anterior naris; the macroscopic specimen includes this part of the lobulated mass intact, much shrunken by spirit; it was not very vascular, and the bleeding was quite moderate. The microscopic section shows the fibrous character of the tumour and especially the abundance of the glandular element. A further report will be supplied later. Few of the nasal fibromata have been shown here, perhaps not one since Dr. Jobson Horne's case in December, 1896.

Dr. JOBSON HORNE: As Dr. Pegler has referred to what I did at the end of the last century, it is only right to explain that, in the light of recent work done by Dr. Pegler, this case would have been labelled "bleeding polypus." It contained more angiomatous than fibrous tissue, and the symptoms were those of bleeding polypus. Therefore, while I was one of the first to show bleeding polypus before this Section, Dr. Pegler is probably the first to show a pure nasal fibroma.

Dr. PEGLER (in reply): There are two points of interest. Anyone examining the scar or stump may gain some information from it. The stump which remains, though it has not been touched since the first operation, is different from that which one finds after operating on fibro-angioma. This will be seen on comparing my case with Mr. Dawson's. One notes its redness and firmness, and I may add—that it has not altered since the third or fourth day after the operation. It was essentially a dry, non-vascular growth. What Dr. McKenzie saw and took for vessels are cross-sections of the muciparous ducts. Where there are ducts there must be glands, and part of the section shows them. The other large spaces are fissures or intrusions of epithelium such as one finds in many nasal growths, especially of the turbinals. They are lined with epithelium and very abundant. Mr. Shattock found these specimens so interesting that he furnished me with a special report, which I shall publish in the *Proceedings* later.

**Aphonia.**—G. C. Cathcart.—Patient, a female, aged twenty-five, was under the care of Dr. Bryan from January, 1914, till the end of July of the same year, and was treated for general weakness, and during April and May for nervous breakdown, laryngitis, and aphonia (one week).

In January, 1915, she again developed laryngitis and aphonia, and was treated in the usual way for six or seven weeks. She was sent to the London Throat Hospital in March. I applied electricity and her voice lasted till the end of May. She then lost it for a week, but it resumed its normal condition during a Zeppelin raid on the night of June 4.

At the end of March, 1916, her voice had again disappeared. Dr. Bryan applied electricity nearly every night until the end of November, when he made an appointment with me to see her. She was examined by the X-rays for tuberculosis with a negative result. I then applied electricity, and her voice lasted for ten days; after that Dr. Bryan applied electricity, which had no effect. He then sent her to me and I made another application of electricity, with the result that the voice resumed its normal condition. She went to Eastbourne for a month and spent three weeks in London.

In 1917 she obtained work at the War Office, and in another few days she again lost her voice. Between February and the end of March I treated her with the faradic current three times, but her voice only lasted a few days after each application. The following are the results of last week's treatment by electricity to date (April, 1917): First night, voice lasted three hours, normal condition; second night, voice lasted one and three-quarter hours, normal condition; third night, voice lasted two and a half hours, normal condition; fourth and fifth nights, voice normal at bedtime but failed by morning; sixth night, voice lasted half an hour.

I should be glad to receive suggestions for treatment.

Mr. H. D. BANKS DAVIS: It is a case of functional aphonia, the bowing of the cords being typical.

## Abstracts.

### PHARYNX.

**On the Lymphatic Relations between the Nasal Fossæ and the Tonsils.**  
Amédée Pognat. "Rev. de Laryngol." July, 1918.

It is no uncommon occurrence for a tonsillitis to develop after operations on the nose, and opinions vary as to whether the infection is conveyed through the lymphatics, through the blood-stream, or merely by passage of septic material over the tonsils.

Schönemann held that the infection was through the lymphatics. He injected a solution containing iodine into the inferior turbinal and removed the tonsil of the same side six hours later. Iodine was demonstrated in the tonsil. Lénart, and also Henke did experiments of the same nature in dogs and came to the same conclusion. Amersbach, later, after similar experiments, could find no trace of the foreign substance in the tonsil.

Pognat last year, in children who were to have their tonsils removed, injected an emulsion of soot into the turbinates twenty-four, thirty-six, and forty-eight hours beforehand and examined the removed tonsils microscopically. In no single case out of some hundred experiments did he find any soot particles in the tonsils. He concluded from this that there is no direct connection between the lymphatics of the nose and the tonsils, and that the latter should therefore not be regarded as lymphatic glands. He believes that post-operative angina cannot be compared to an adenitis.

*J. K. Milne Dickie.*

### NOSE.

**Atrophic Rhinitis treated with Ichthyl Ointment.**—Robert H. Fowler.  
"The Laryngoscope," December, 1917, p. 904.

Fowler advocates the use of an ointment consisting of ichthyl, 20 gr.; menthol, 2 gr.; and petrolatum, 2 oz. This to be applied three times a day on cotton in each nostril. Application of the ointment abolishes the bad smell so long as the patient continues the treatment. Fowler does not claim that the treatment is more than palliative.

*J. S. Fraser.*

**A Wax Model of the Nasal Cavity and Paranasal Sinuses.**—C. M. Jackson and C. E. Connor. "Annals of Otology, etc." xxvi, p. 585.

This carefully made wax cavity, taken from a well-developed head, was made by sectional method. It includes the nasopharynx. The description requires to be read *in extenso*. It is the intention to have this model reproduced and placed on the market.

*Macleod Yearsley.*

### LARYNX.

**Abscess of the Thyro-glosso-epiglottic Space.**—Bellin and Vernet.  
"La Presse Médicale," March 7th, 1918.

The authors report this case as one of few that have been recorded; the first being reported by Braus and Brault in 1893.

The abscess is evolved entirely in the space comprised between the base of the tongue, the larynx, and the epiglottis. The patient, a sergeant in the French Army, on leave from the Front, reported on

November 11, suffering from violent dyspnoea and inability to swallow. Saliva mixed with blood and pus, and of a putrid odour, dribbled from the mouth. The tongue was fairly mobile; there was no trismus. On depressing the tongue swelling at the right base could be seen; lingual and faucial tonsils and velum normal.

Laryngoscopic examination revealed a swelling, the size of a walnut, occupying the left side of the glosso-epiglottic space. Epiglottis wine-red and swollen, deviated to right. Oedema of the entire vestibule of the larynx, particularly of the left side. The glottis was obstructed by oedema; view of left vocal cord obstructed by swelling; right cord normal. The tumour did not extend beyond the median glosso-epiglottic fold. There was a history of exposure to cold and wet while fatigued. Operation was done at once. The abscess was opened by "transverse subthyroid pharyngotomy under local anaesthesia, the incision crossing the middle line but chiefly to the left." Foul-smelling pus was evacuated, and the opening examined and enlarged by the finger carried to the anterior face of the epiglottis. A drain was inserted. Difficulty in breathing continuing, a tracheotomy was done under local anaesthesia. Condition of patient was grave for three days; delirium accompanied by temperature of 40° C. Drain removed on second day, and wound packed with iodoform gauze. Delirium disappeared on third day and temperature dropped to 39° C. During lavage with Dakin's solution on the fourth day there was a violent and copious hæmorrhage from the mouth, patient stopped breathing, and the cannula of the tracheotomy tube was removed and breathing restored by artificial respiration. After the fourth day patient improved rapidly. The wound was not entirely closed until the fortieth day. For the first few days the patient was fed through a nasal tube.

It is claimed that the extent of the swelling and the grave condition of the patient indicated evacuation of the pus by an external operation rather than by an entrance in the buccal cavity. Entrance to the thyro-glosso-epiglottic space is easy. The anterior wall of the space is formed by the thyrohyoid and hyoglossal membranes; the posterior wall by the anterior face of the epiglottis. The glosso-epiglottic ligament divides the space into two distinct compartments.

The patient of Brasseur and Brault, at first operated on by a lateral cervical pharyngotomy, was not relieved, and was again operated on by a subhyoid transverse incision.

Bacteriological examination of the pus demonstrated the presence of a club-shaped bacillus, Gram positive, analogous to *B. perfringens*; also a monococcus, Gram negative, arranged in short chains, analogous to *diplococcus reniformis*.

The article, which is very interesting and should be read in the original, concludes with differential diagnoses of:

- (a) Abscess of the base of the tongue.
- (b) Abscess of the floor of the mouth.
- (c) Pharyngo-laryngeal abscesses.

J. A. M. Hemmeon.

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### EAR.

**The Static Labyrinth in Syphilis.**—J. W. Downey. "Annals of Otol-ogy," xxvi, p. 693.

Gives details of seventeen cases, made during eighteen months. The auditory function was disturbed in most of the cases; the tests of the



static apparatus, made by rotation and cold douching, were of far greater value in absolutely confirming the presence of a lesion in the nervous structures of the ear than were the tests of audition.

*Macleod Yearsley.*

**Complete Unilateral Deafness, resulting from Acute Parotitis.**—George H. Willcutt. "The Laryngoscope," November, 1917, p. 811.

Of thirty-four (collected) cases of deafness following mumps the affection was bilateral in seventeen. In many there was tinnitus and vertigo, the latter lasting from a few hours to some days. Four patients suffered from vomiting. The deafness usually comes on about the fourth or fifth day, sometimes as late as the tenth or fifteenth. Willcutt reports the case of a female, aged twenty-nine, with previously normal hearing. The patient developed parotitis with bilateral swelling, but no temperature. Six days later there was nausea, vomiting, and vertigo, and the patient was unable to lift her head from the pillow. Two days later the vomiting had ceased, and the nausea was slight, but the vertigo persisted, and for a week the patient could not walk without staggering. In three weeks Willcutt examined the patient, and found complete deafness in the left ear with a normal right ear. Both drumheads were healthy. Injections of 2 per cent. pilocarpine (5 minims) were begun, and the patient showed a good reaction. In all, seven injections were given, but there was no improvement in the condition of the left ear. Examination after three months showed complete unilateral deafness. Attacks of vertigo were still present, most marked when turning to the right.

*J. S. Fraser.*

## REVIEW.

*Operative Surgery of the Nose, Throat and Ear, for Laryngologists, Rhinologists, Otologists, and Surgeons.* By HANAU W. LOEB, A.M., M.D., in collaboration with JOSEPH C. BECK, M.D., GEORGE W. CRILE, M.D., WILLIAM H. HASKIN, M.D., ROBERT LEVY, M.D., HARRIS P. MOSHER, M.D., GEORGE L. RICHARDS, M.D., GEORGE E. SHAMBAUGH, M.D., and GEORGE B. WOOD, M.D. In two volumes. Vol. II. Pp. 427. 476 illustrations. London: Henry Kimpton. 1917. Price of the two volumes complete, £3.

The publication of the second volume of this extensive work has been delayed for a considerable time, but the time has not been lost, as the collaborators have obviously been at great pains to bring their information well up to date. Whether recent or not they have learnt one lesson, and they convey it with proper insistence—that operations, especially in the nasal cavities, should not be lightly undertaken. Dr. Hanau Loeb points out the great desirability of carrying them out under hospital conditions.

The article begins with the surgery of the septum, which, in accordance with modern ideas, centres itself mainly on the submucous operation as worked out by Killian, Freer, and Hajek. Of the non-submucous operations Moure's seems the most acceptable. Among operations on the turbinate bodies the use of the snare for the posterior extremity of the inferior one is recommended, and to facilitate it Beck's ingenious clip with thread attached is described. There is no reference to the forceps of Prince, of Springfield, which is certainly most effective and speedy in action when used to complete an "adenoid" operation. Among the

indications for the resection of the middle turbinate, in addition to "headaches, sneezing, epiphora, and other eye symptoms, and hyperæsthetic nasal conditions," we would have included spasmodic asthma. Struyken's forceps and Halmer's scissors seem to be the most handy instruments, supplemented by the snare. A wise caution is given against dragging away portions of the middle turbinate near the cribriform plate.

The author takes the ethmoid cells first into consideration as a departure from the usual rule of writers on sinus disease. He gives very fine illustrations of Mosher's operation, and also of Halle's flap, which has not been much noticed by our writers. It appears a somewhat meticulous refinement. The intranasal operations for all the sinuses are very fully described, and so also are the extranasal ones. The account of Killian's frontal sinus operation is one of the best. Canfield's operation on the maxillary antrum seems a good "rhinologist's" modification of Denker's for chronic antral suppuration, but Denker's offers more possibilities in relation to new growths. The lacrymal sac operations receive full notice. The rhinologist now claims the pituitary hypophysis, and its exposure through the sphenoid is fully described and illustrated.

Old-fashioned throat surgeons will marvel at the extraordinary amount of interest attaching to the operative surgery of the tonsils. The various operations for the release of the soft palate when adherent to the pharynx will be found thoroughly dealt with, Mackenty's deserving special study, though its application to syphilitic adhesions with cicatricial contraction must in some cases be extremely difficult.

There is a chapter by Dr. Robert Levy on endo-laryngeal operations which covers the subject very fully, considerable reference being made to the contributions of British laryngologists. The author's tube for dilatation in laryngeal stenosis seems well devised, and it is placed in the hands of patients for self-use.

Among the aural operations Dr. Haskin gives an honoured place to ossiculectomy, a proceeding which it is rather fashionable to decry—quite unjustly in our opinion. Dr. Hanau Loeb takes the mastoid and neighbouring parts under his special protection and elaborates the surgery with loving care. Nothing that illustration can help in elucidating is omitted, so that this is one of the most valuable chapters in the book. We may note that he is an ardent advocate for ligation of the jugular vein when the diagnosis of sinus thrombosis is established, also for the removal of every vestige of cholesteatoma. We (the reviewer) hope he will consider the correctness of modified views in regard to these points. The true indication for the modified mastoid operation is not mentioned, namely, a suppuration in the neighbourhood of the aditus and antrum, with complete separation from the lower and anterior part of the tympanic cavity as laid down by Bondy in his original paper. The indications for labyrinth operation are mainly those formulated by Ruttin, and the various operations are, as we should expect, very fully illustrated. The Jansen-Neuman operation is very clearly shown. The latest treatment for meningitis is probably Haynes' bold attack on the cisterna from the occipital region. We are still waiting for some statement of results obtained by it. Frontal abscess is a very rare result of aural suppuration but we have seen it once, and therefore welcome the account of Beck's prefrontal operation.

On the whole the work is an epoch-making one. It is conceived on a grand scale, the letter-press being difficult to beat and the illustrations quite unsurpassed.

*Dundas Grant.*

## NOTES AND QUERIES.

THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR STCLAIR THOMSON cordially invites all British Oto-Laryngologists who are interested in the working of our JOURNAL to attend a Conference to be held at 64, Wimpole St., London, W. 1, on Friday, November 1, at 8.45 p.m.

"PELION" ON THE NOMENCLATURE OF MASTOID OPERATIONS.

SIR,—When are we going to reform the present chaotic and absurd nomenclature of the above operations?

I hear, for example, of one operation called "Schwartz's"; of another, "Stacke's"; of a third—a shadowy third—known popularly as "Heath's." Then, look at the infinite variety of "plastics," each designated by the name of some otherwise obscure otologist—for the life of me I cannot remember any of them at the moment. But it does not matter really.

Then, again, people talk to me of "cortical" mastoids, "radical" mastoids, "conservative" mastoids, and I am awaiting every day the advent of "socialist" mastoids, and finally, "Bolshevik" mastoids. We have long since been anarchists; at least in terminology.

Take the "radical mastoid" as an example. Here is an operation which generally has nothing whatever to do with the mastoid process. Cheatle, who ought to know, says somewhere that it is performed through the squamous bone. And who was it, can anybody tell me, whose brilliance first applied to it the bounding epithet of "radical"? There is nothing *radical* about it. It is essentially an exploration. To be radical the petrous, or at least the outer wall of the labyrinth, would have to be removed. Now, does any otologist ever blush when, a year after his "radical" operation, he finds himself still mopping pus from the tympanum and telling his patient to "go on with the drops"?

It ought to be called the "antro-tympanic operation"—only that and nothing more. PELION.

P.S.—Will you kindly thank Dr. J. S. Fraser for his reply to my last letter? It shows that one man has been thinking ahead.—P.

THE FACE-MASK IN THE CONSULTING ROOM.

Many oto-laryngologists are now wearing face-masks when examining their patients, both in hospital and in private practice. The sense of protection they impart is very grateful, and patients seem to appreciate the lesson they convey

D.M.

A CORRECTION.

In the "legend" of the skiagram on p. 282 of our last issue, for "ninth" please read "seventh" rib.

BOOKS RECEIVED.

*Pathologie de Guerre du Larynx et de la Trachée.* Par E. J. Moure, G. Liébault, et G. Canuyl. With 128 figures and 8 coloured plates. Paris: Librairie Félix Alcan, 108 Boulevard St. Germain. 1918. Price 26.50 fr.

*The Twin Ideals: An Educated Commonwealth.* By Sir James W. Barrett, K.B.E., C.B., C.M.C., M.D., M.S., F.R.C.S.(Eng.). Two volumes. London: H. K. Lewis & Co., Ltd. Price 25s.

*An Enquiry into the Analytical Mechanism of the Internal Ear.* By Sir Thomas Wrightson, Bart. With an Appendix by Arthur Keith, M.D. London: Macmillan & Co., Ltd. 1918.

THE  
JOURNAL OF LARYNGOLOGY,  
RHINOLOGY AND OTOTOLOGY.

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### PRESIDENT'S ADDRESS AT THE SECTION OF OTOTOLOGY.<sup>1</sup>

BY H. J. BANKS-DAVIS, M.B.

MAY I say a few words before we commence the work of the Session in order to express to you how deeply sensible I am of the honour which the members of this Section have conferred upon me by electing me their President. I need not say that during my term of office I intend to do all I can to maintain the high reputation which this Section enjoys.

Election to the membership of the Otological Section has never been easy, as the qualifications demanded are very high and very special, and as a result of this nearly all members are teachers of otology and officers in charge of clinics of their own, in well-known special and general hospitals. This *may* be an excellent thing—personally I think it is—so long as it is remembered that the *Proceedings* of the Section are read very widely by medical men who may not have the same opportunities of acquiring special knowledge in otology as we have, but who are anxious—and rightly so—to keep abreast of modern advance in the pathology and treatment of aural diseases. I say this, as I am inclined to think—and I am sure that others will agree—that there has been a tendency of late years to report upon and exhibit cases at our meetings of unusual and special interest only, on the assumption that other than these can be of no interest to members, who in their clinics see plenty of such cases themselves. This vein is apt to permeate the discussions, and some very practical and useful remarks that an exhibitor or speaker might make, as a result of his own experience, are not made at all, and much information is unrecorded and lost. Everybody's *experience* is always worth recording, although everybody's *opinion* may not be.

Some years ago, when I was a secretary to the Section in pre-war days, I often found great difficulty in inducing members to exhibit cases and records of their experiences, the usual excuse being—"It is no use showing such a case as that as everybody knows all about it." I sometimes observed that when the case was brought forward nobody seemed to know anything about it, and sometimes not even the exhibitor himself.

<sup>1</sup> Read before the Royal Society of Medicine, Section of Otology, on November 16, 1917.



It is part of our duty as a Section to promote knowledge as much as possible among other members of the medical profession as well as among ourselves, and I hope that you will do all you can—even in these days—to make our meetings a success by exhibiting cases, relating their histories, and better still, by coming to the meetings and telling us what you know, to the mutual advantage of us all.

Owing to the exigencies of the war many of our prominent members are occupied with military duties elsewhere, and as a consequence the Council have thought it desirable to curtail the usual number of meetings. The February meeting will be devoted to a discussion on "The Influence of Abnormalities and Diseases of the Nose on the Ear." It is high time that this important matter should be settled, and the expression of our opinion as a Section given one way or the other: some of us appear to disregard this influence altogether; others appear to attach too much importance to it. Which is right?

This question has really an important bearing on aviation. Experience shows that aviators with nasal obstruction and other nasal irregularities sooner or later are liable to be handicapped by disturbances of equilibrium when flying. On making rapid ascents or descents they become giddy, confused, and uncertain of themselves; but when the nasal deformity is rectified these symptoms vanish. This is my own experience. In a minor degree this applies to gunners in the naval and military services, who are exposed to severe aerial concussions. Observations on these points should be brought before the Section, and the discussion should enable us to come to a reasonable conclusion, so that our edict may go forth and be recorded as "official to date."

Several other points I should like to see brought forward: What, for instance, is the best after-treatment for operations on the mastoid? What is the experience of members after packing the cavity with Morison's paste? Personally I have tried all after-treatments recommended, including the blood-clot dressing introduced by Holmes, of Cincinnati, U.S.A., and a very good one it is. I find that Morison's paste packed *lightly* into the wound accelerates repair and shortens the after-treatment considerably, but I have also observed that if too much is packed into the wound—especially into the middle ear, where absorption is more rapid—symptoms of poisoning are apt to supervene, not from the iodoform, but from the bismuth, as shown by a blue line on the gums, abdominal pain and nausea. Is this usual, or is it very exceptional? In cases complicated by cerebral abscess I never use this paste as it impedes drainage owing to its consistency. Is this the experience of others?

Again, have we any better or more modern treatment to shorten the duration of an Eustachian catarrh with a simple catarrhal otitis media, which since the war has been unusually prevalent? The course of some of these cases is protracted, and a great deal of incapacity from deafness results which seems to be out of all proportion to any signs observable in the membrane. I find the average duration of these cases is often many weeks, in spite of the usual treatment—*e.g.* cocaine and adrenalin drops, menthol vapours, blistering, nasal insufflation, and so on. Is there any advance in the treatment of this affection? If so, let us have it.

Again, can nothing more be done to alleviate the symptoms of otosclerosis—and how can cases of otosclerosis always be distinguished from those of chronic adhesive catarrh—or rather the results of attacks of chronic adhesive catarrh where symptoms of otosclerosis are present, but where the membrane appears normal, *i.e.* is not yet affected, and where adhesions are confined to the inner tympanic wall binding down the

stapes and producing symptoms of otosclerosis, although these adhesions are not observable? Otosclerosis is often a simulated disease, and I submit that this is the reason.

And, lastly, for tinnitus—the “bugbear of otology”—what is the best treatment for relieving this? Or must we continue to disregard it unless we happen to have it ourselves?

I am sure that the experience of many of our members on the above points would be invaluable. The most important diseases are those that are the commonest, and any modern methods advocated by members of this Section for the alleviation of these would be most acceptable to us as otologists, as well as of inestimable value to the outside world.

## REPORTS FOR THE YEARS 1916 AND 1917 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

*Under the care of* A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

### PART II.

### STATISTICAL TABLES

BY

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J. S. FRASER, M.B., CH.B., F.R.C.S.E.,

AND

W. T. GARRETSON, M.D.(IOWA), F.R.C.S.E.

	1916. (1120)	1917. (967)
AFFECTIONS OF THE NOSE.		
I. <i>The External Nose.</i>		
Fracture of nasal bones . . . . .	11	18
Angioma . . . . .	1	0
Broadening of external nose (unknown cause) . . . . .	0	2
Erysipelas . . . . .	0	1
Collapse of ala nasi . . . . .	2	0
Dermatitis of vestibule . . . . .	39	48
Furuncle of vestibule . . . . .	1	3
Lupus of external nose . . . . .	2	2
Syphilitic disease . . . . .	0	2
Papilloma of vestibule . . . . .	0	2
Cyst of vestibule . . . . .	1	0
Rodent ulcer of external nose . . . . .	1	1
	<hr/> 58	<hr/> 79
II. <i>The Nasal Cavities.</i>		
Deflection of septum to right . . . . .	110	94
Deflection of septum to left . . . . .	126	99
Irregular deflections . . . . .	37	26
Simple ulcer of septum . . . . .	0	1
Perforation of septum (simple) . . . . .	2	4
Hæmatoma and abscess of septum . . . . .	2	3
Papilloma of septum . . . . .	0	1
Angioma of septum . . . . .	0	1
Ecchondrosis of septum . . . . .	0	1
Gumma of septum . . . . .	1	0
Acute, subacute, and chronic rhinitis . . . . .	143	117
Inferior turbinal enlargement . . . . .	279	239
Polypoid middle turbinals and nasal polypi . . . . .	109	76

	1916.	1917.
Purulent rhinitis . . . . .	17	4
Fibrinous rhinitis . . . . .	6	2
Atrophic rhinitis (non-fœtid) . . . . .	29	19
Atrophic rhinitis (fœtid) . . . . .	22	27
Rhinitis sicca . . . . .	14	14
Epistaxis . . . . .	46	42
Lupus of nasal mucous membrane . . . . .	7	15
Syphilitic disease (tertiary) of nasal cavities . . . . .	16	13
Foreign bodies in nose . . . . .	12	11
Nasal neurosis (including asthma) . . . . .	82	75
Cyst of floor of nose . . . . .	0	1
Papilloma of inferior turbinal . . . . .	1	0
Essential anosmia . . . . .	1	2
Congenital atresia of anterior nares . . . . .	0	1
	<hr/> 1062	<hr/> 888

## ACCESSORY NASAL SINUSES.

	(81)	(72)
Acute antral catarrh . . . . .	1	0
Acute antral suppuration . . . . .	3	2
Chronic antral catarrh . . . . .	4	4
Chronic antral suppuration (unilateral) . . . . .	14	12
Chronic antral suppuration (bilateral) . . . . .	5	3
Naso-antral polypi . . . . .	9	10
Dental cyst invading antrum . . . . .	8	3
Acute frontal sinus catarrh . . . . .	7	5
Chronic frontal sinus suppuration . . . . .	1	0
Acute fronto-maxillary catarrh . . . . .	1	0
Acute fronto-maxillary suppuration . . . . .	1	0
Acute antro-ethmoidal suppuration . . . . .	4	4
Acute antro-ethmoidal suppuration (with orbital complication) . . . . .	1	0
Chronic frontal, ethmoidal and antral suppuration . . . . .	1	2
Chronic fronto-ethmoidal suppuration . . . . .	4	1
Chronic fronto-ethmoidal suppuration (with orbital complication) . . . . .	1	0
Chronic ethmoidal (posterior) and sphenoidal suppuration . . . . .	1	2
Pansinusitis . . . . .	1	0
Sequestrum of frontal process of superior maxilla . . . . .	1	0
Acute osteomyelitis of right superior maxilla . . . . .	1	0
Fibroma of left superior maxilla . . . . .	1	0
Squamous epithelioma of left superior maxilla . . . . .	1	0
Chondro-sarcoma of left superior maxilla . . . . .	1	0
Malignant disease of right superior maxilla . . . . .	0	2
Dacryocystitis . . . . .	9	22
	<hr/> 81	<hr/> 72

## DISEASES OF NASO-PHARYNX, PHARYNX AND FAUCES.

	(1507)	(1462)
Adenoids and enlarged tonsils . . . . .	1251	1250
Acute tonsillitis . . . . .	28	36
Peritonsillar abscess . . . . .	6	7
Vincent's angina . . . . .	2	3
Diphtheria . . . . .	4	0
Ludovic's angina . . . . .	0	1
Retro-pharyngeal abscess (tubercular) . . . . .	0	1
Acute catarrhal pharyngitis . . . . .	8	7
Naso-pharyngeal catarrh . . . . .	6	8
Thornwaldt's disease . . . . .	3	1
Chronic pharyngitis, including granular pharyngitis . . . . .	49	43
Pharyngitis sicca . . . . .	18	11
Keratoses pharyngis . . . . .	1	1
Retention cyst of tonsil . . . . .	5	4
Elongated uvula . . . . .	7	4
Varicose veins at base of tongue . . . . .	0	1
Hypertrophy of lingual tonsil . . . . .	9	7

	1916.	1917.
Lupus of soft palate and pharynx . . . . .	5	6
Secondary syphilis of fauces and pharynx . . . . .	13	11
Tertiary syphilis of fauces and pharynx . . . . .	22	10
Malignant tumours of fauces and pharynx . . . . .	12	7
Malignant tumours of naso-pharynx . . . . .	1	2
Foreign bodies in fauces and pharynx . . . . .	16	7
Congenital atresia of pharynx . . . . .	0	1
Telangiectasis of palate and pharynx . . . . .	0	2
Cicatricial condition of soft palate following diphtheria . . . . .	0	1
Post-diphtheritic paralysis of soft palate . . . . .	3	0
Paralysis from other causes . . . . .	3	0
Sensory neurosis . . . . .	14	18
Cleft palate . . . . .	6	2
Syphilitic disease of palate . . . . .	14	8
Injury to palate . . . . .	1	1
Bilateral perforation of palate . . . . .	0	1
	<hr/> 1507	<hr/> 1462

## DISEASES OF THE MOUTH.

	(21)	(36)
"Hairy" tongue . . . . .	1	0
Simple ulcer of tongue . . . . .	0	1
Angioma of tongue . . . . .	0	1
Superficial glossitis . . . . .	3	1
Telangiectasis of tongue . . . . .	1	0
Malignant disease of tongue . . . . .	5	6
Leucoplakia of tongue . . . . .	1	0
Neurosis of mouth and tongue . . . . .	3	4
Salivary calculus . . . . .	3	1
Pyorrhœa alveolaris (marked) . . . . .	3	18
Periodontal abscess . . . . .	0	2
Lupus of mucous membrane of cheek . . . . .	1	0
Carcinoma of alveolar process . . . . .	0	1
Cyst of lip . . . . .	0	1
	<hr/> 21	<hr/> 36

## AFFECTIONS OF THE LARYNX AND TRACHEA. (159) (161)

I. *Acute.*

Acute catarrhal laryngitis . . . . .	16	20
Acute œdematous laryngitis . . . . .	3	0
	<hr/> 19	<hr/> 20

II. *Chronic.*

Chronic catarrhal laryngitis . . . . .	23	16
Laryngitis sicca . . . . .	5	10
Vocal nodules . . . . .	2	4
Pachydermia of larynx . . . . .	2	3
Lupus of larynx . . . . .	0	4
Tubercular disease of larynx . . . . .	18	17
Syphilitic disease of larynx (tertiary) . . . . .	10	5
	<hr/> 60	<hr/> 59

III. *Tumours.*

Simple:		
Fibroma of left vocal cord . . . . .	0	1
Papilloma . . . . .	5	1
Cystic enlargement of mucous glands . . . . .	0	1
Prolapse of ventricle . . . . .	1	0
Malignant:		
Intrinsic . . . . .	5	2
Extrinsic . . . . .	7	5
Infiltration of larynx following malignant disease of thyroid (sarcoma) . . . . .	0	1
	<hr/> 18	<hr/> 11



IV. *Affections of Laryngeal Nerves.*

	1916.	1917.
Congenital laryngeal stridor . . . . .	1	2
Inspiratory laryngeal spasm . . . . .	0	1
Functional aphonia . . . . .	20	19
Abductor paralysis of left vocal cord . . . . .	0	1
Complete recurrent paralysis of right vocal cord . . . . .	5	4
Complete recurrent paralysis of left vocal cord . . . . .	7	1
Bilateral abductor paralysis . . . . .	0	1
Sensory laryngeal neurosis . . . . .	1	5
Mogiphonia . . . . .	0	1
Laryngeal nerves involved in general neuro-fibromatosis . . . . .	0	1
	<hr/> 34	<hr/> 36

V. *Miscellaneous.*

Subglottic stenosis of larynx following intubation for diphtheria . . . . .	2	1
Subglottic infiltration of larynx of unknown origin . . . . .	4	0
Stenosis of larynx following bullet-wound . . . . .	0	2
Partial laryngeal and tracheal stenosis from goitre . . . . .	0	1
Injury to larynx (cut-throat) . . . . .	0	1
Injury to larynx causing fixation of R.V.C. . . . .	0	1
Simple goitre . . . . .	21	25
Thyroglossal cyst . . . . .	1	0
Malignant disease of thyroid gland . . . . .	0	4
	<hr/> 28	<hr/> 35

## AFFECTIONS OF HYPO-PHARYNX AND ŒSOPHAGUS. (33) (23)

Stricture :		
(a) Simple . . . . .	1	0
(b) Malignant (including post-ericoid carcinoma) . . . . .	13	8
Neurosis of hypo-pharynx and œsophagus ? . . . . .	7	6
Foreign bodies in hypo-pharynx and œsophagus . . . . .	10	7
Œsophageal fistula from T.B. gland . . . . .	1	0
Hypo-pharyngeal pouch . . . . .	0	1
Cicatricial contraction of œsophagus . . . . .	0	1
Traumatic ulceration of œsophagus . . . . .	1	0
	<hr/> 33.	<hr/> 23

## AFFECTIONS OF THE EAR. (1749) (1486)

I. *The External Ear.*

Congenital malformation . . . . .	3	1
Injury to ear . . . . .	4	5
Hæmatoma . . . . .	1	0
Cyst of lobule . . . . .	4	3
Erysipelas of auricle . . . . .	1	0
Angio-neurotic œdema of auricle . . . . .	1	0
Lupus of auricle . . . . .	2	0
Cerumen . . . . .	149	145
Furunculosis . . . . .	37	40
Otitis externa diffusa . . . . .	61	39
Exostosis . . . . .	0	1
Hyperostosis . . . . .	1	0
Foreign bodies . . . . .	4	5
Traumatic rupture of tympanic membrane . . . . .	4	6
Malignant disease of external ear . . . . .	1	1
Sebaceous cyst over mastoid . . . . .	0	1
Glandular abscess over mastoid . . . . .	3	1
	<hr/> 276	<hr/> 248

II. <i>The Middle-ear Cleft.</i>		1916.	1917.
Eustachian obstruction . . . . .		172	148
Acute non-suppurative otitis media . . . . .		84	85
Chronic non-suppurative otitis media . . . . .		63	61
Acute suppurative otitis media:			
Right . . . . .		60	43
Left . . . . .		59	53
Bilateral . . . . .		17	13
Chronic suppurative otitis media:			
Right . . . . .		147	152
Left . . . . .		160	107
Bilateral . . . . .		120	75
Sequelæ of chronic suppurative otitis media:			
Right . . . . .		72	54
Left . . . . .		57	71
Bilateral . . . . .		51	56
Acute suppurative otitis media with mastoid complication:			
Right . . . . .		22	13
Left . . . . .		23	8
Bilateral . . . . .		0	2
Chronic suppurative otitis media with mastoid complication:			
Right . . . . .		50	30
Left . . . . .		47	39
Bilateral . . . . .		1	3
Tubercular otitis media:			
Right . . . . .		4	1
Left . . . . .		6	1
Bilateral . . . . .		1	1
		1216	1016

## III.

Otosclerosis . . . . .	52	65
Mixed middle and inner deafness . . . . .	42	26
	94	91

IV. *Internal Ear Affections.*

Congenital (including deaf-mutism) . . . . .	11	9
Traumatic (following shell explosion) . . . . .	21	14
Traumatic (following injury other than shell explosion) . . . . .	3	1
Occupational . . . . .	4	6
Functional . . . . .	1	4
Senile changes . . . . .	11	8
Circumscribed labyrinthitis or labyrinth fistula . . . . .	4	2
Serous labyrinthitis . . . . .	0	1
Acute purulent labyrinthitis . . . . .	3	0
Latent labyrinth suppuration . . . . .	4	4
Healed labyrinthitis following otitis media . . . . .	3	2
Healed labyrinthitis following epidemic cerebro-spinal meningitis . . . . .	0	2
Congenital syphilis . . . . .	15	11
Acquired syphilis . . . . .	4	2
Leukæmic hæmorrhage into labyrinth . . . . .	0	1
Suspected cerebellar lesion . . . . .	1	0
Unknown causes of nerve-deafness . . . . .	68	60
Aural neurosis and neuralgia . . . . .	10	4
	163	131

V. *Intra-cranial Complications of Suppurative Otitis Media.*

1916: Five complicating acute otitis media. . . . .	(11)	(19)
Six complicating chronic otitis media.		
With 8 recoveries; 3 deaths.		
Extra-dural peri-sinus abscess . . . . .	1	—
Extra-dural peri-sinus abscess and sigmoid sinus thrombosis . . . . .	1	—

	1916.	1917.
Signs of cerebral abscess; exploration of temporo-sphenoidal lobe; probably cerebral oedema . . . . .	1	—
Acute purulent lepto-meningitis . . . . .	2	—
Serous meningitis in posterior fossa . . . . .	1	—
Meningitis without growth of organism in cerebro-spinal fluid . . . . .	1	—
Sigmoid sinus thrombosis: metastatic abscess in right iliac bone . . . . .	1	—
Sigmoid sinus thrombosis: labyrinth suppuration . . . . .	1	—
Sigmoid sinus thrombosis with thrombosis of superior longitudinal sinus and encephalitis . . . . .	1	—
General blood infection without growth of organism in cerebro-spinal fluid . . . . .	1	—
	<hr/> 11	

1917: Two complicating acute otitis media.

Seventeen complicating chronic otitis media.

With 11 recoveries; 8 deaths.

Extra-dural peri-sinus abscess . . . . .	—	4
Extra-dural peri-sinus abscess, meningitis, temporo-sphenoidal abscess . . . . .	—	1
Extra-dural peri-sinus abscess, sinus thrombosis, meningitis . . . . .	—	1
Extra-dural peri-sinus abscess, cerebellar abscess . . . . .	—	1
Extra-dural peri-sinus abscess, sinus thrombosis . . . . .	—	2
Extra-dural peri-sinus abscess, meningitis . . . . .	—	1
Temporo-sphenoidal abscess . . . . .	—	1
Temporo-sphenoidal abscess and meningitis . . . . .	—	1
Acute purulent lepto-meningitis . . . . .	—	1
Serous meningitis . . . . .	—	1
Sigmoid sinus thrombosis . . . . .	—	3
Sigmoid sinus thrombosis, lepto-meningitis . . . . .	—	1
Latent labyrinthitis: sigmoid sinus thrombosis . . . . .	—	1
	<hr/> 19	

#### MISCELLANEOUS CASES.

These include cases sent from other wards in the hospital with negative findings, enlarged cervical glands, skin-diseases, headaches of obscure origin, mental defects, eye cases, carious teeth, hæmoptysis, epilepsy, sycosis, etc.

These cases numbered . . . . .	132	121
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#### TABLE OF OPERATIONS.

##### *The Nose.*

Fracture of nasal bones (rectified) . . . . .	4	5
Abscess of nasal septum . . . . .	1	3
Submucous resection of septum . . . . .	148	79
Turbinotomy . . . . .	121	91
Nasal polypi (including return cases) . . . . .	168	140
Curetting (for lupus) . . . . .	7	18
Papilloma removed . . . . .	1	1
Rodent ulcer . . . . .	0	1
Plastic operation on nose . . . . .	1	0
Foreign bodies removed from nose . . . . .	10	9
Injection of paraffin . . . . .	2	1
Operation on tear-sac (West's operation) . . . . .	9	20
	<hr/> 472	<hr/> 368

##### *Accessory Nasal Sinuses.*

Proof puncture of antrum . . . . .	144	61
Intra-nasal operation on antrum . . . . .	10	8
Radical operation on antrum . . . . .	16	14
Naso-antral polypi (radical operation on antrum) . . . . .	6	6
Dental cyst invading antrum . . . . .	8	3

	1916.	1917.
Intra-nasal operation on frontal sinus . . . . .	0	1
Radical operation on frontal sinus . . . . .	4	2
Operation on ethmoid cells (intra-nasal) . . . . .	4	5
Operation on sphenoid (intra-nasal) . . . . .	0	2

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192 102
*Mouth and Pharynx.*

Tonsils and adenoids removed (guillotine and curette) .	1164	1105
Tonsils dissected out (scissors and snare) . . . . .	33	31
Lingual tonsil removed . . . . .	1	0
Peritonsillar abscess . . . . .	10	9
Retro-pharyngeal abscess . . . . .	0	1
Curetting of palate for lupus . . . . .	2	5
Angioma of tongue removed . . . . .	1	0
Cyst of lip removed . . . . .	0	1

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1211 1152
*Larynx, Trachea, and Esophagus.*

Suspension laryngoscopy (examination) . . . . .	17	19
Suspension laryngoscopy (with operation):		
Papilloma removed . . . . .	1	3
Vocal nodule . . . . .	0	2
Lupoid tissue . . . . .	0	2
Cauterisation for lupus . . . . .	0	3
Foreign body removed . . . . .	1	0
Intubation . . . . .	1	1
Esophagoscopy (examination) . . . . .	17	22
Esophagoscopy (removal of foreign body) . . . . .	4	3
Tracheotomy . . . . .	4	6
Laryngectomy . . . . .	1	0
Thyrotomy . . . . .	0	1
Radium applied to malignant growth . . . . .	2	0

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48 62
*The Ear.*

Furunculosis . . . . .	6	8
Exostosis of external meatus . . . . .	0	1
Paracentesis . . . . .	24	21
Ear granulations curetted . . . . .	11	9
Tumour of external meatus . . . . .	1	0
Sebaceous cyst of auricle . . . . .	0	1
Sebaceous cyst over mastoid . . . . .	0	2
Glandular abscess over mastoid . . . . .	1	1
Plastic operation . . . . .	11	6
Eustachian tube curetted . . . . .	0	1
Aural polypi . . . . .	44	16
Foreign bodies removed from ear . . . . .	3	5
Schwartz operation on mastoid . . . . .	46	25
Modified radical operation . . . . .	1	3
Radical mastoid operation . . . . .	94	72
Old mastoid wound re-opened and necrosed bone removed	0	2
Operations on labyrinth . . . . .	10	2
Extra-dural peri-sinus abscess . . . . .	4	8
Extra-dural middle fossa abscess . . . . .	0	2
Cerebellar abscess . . . . .	0	1
Temporo-sphenoidal abscess . . . . .	0	3
Operations on sigmoid sinus . . . . .	2	9
Internal jugular vein ligated . . . . .	3	7
Operations for lepto-meningitis . . . . .	2	6

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263 211

Intravenous injection galy! . . . . .	0	2
Intravenous injection eusol . . . . .	2	0
	2	2



<i>Anæsthetics administered.</i>		1916.	1917.
Ethyl chloride . . . . .		1164	1125
Chloroform followed by ether . . . . .		242	167
Chloroform . . . . .		12	38
Ether . . . . .		6	6
Local anæsthesia . . . . .		742	531
		<hr/> 2166	<hr/> 1867

Number of new out-patients attending the Department = 3132.

## NOTE ON THE HISTOLOGICAL CHANGES OCCURRING AT THE SITE OF PARAFFIN INJECTION.

BY WYATT WINGRAVE.

A SPECIMEN marked "Tissue from the site of a paraffin injection," supplied by Dr. Dan McKenzie, has afforded opportunity for these observations.

It was found that the paraffin had penetrated indiscriminately between muscle-fibres and areolar tissue, compressing and distorting them so that their identity was often obscured, the individual muscle-fibres being cloudy and their striation lost. These tracts and spaces, both large and small, were all lined by endothelium, either as a single flattened layer or as several swollen cells. At various points they were so massed as to suggest neoplastic activity. These cells varied considerably in size and shape, some exhibiting characters like "young giant" cells with one or more nuclei. Most of them, however, were mononucleated, with abundant cytoplasm, recalling syncytial or decidual elements. They evidently underwent two changes: (1) A fibroblastic, which predominated, and (2) retention of form with grouping, massing, or spreading. Plasmocytes and lymphocytes—the significant and invariable associates of slow toxic inflammation—were absent.

The changes were therefore strictly endothelial and conservative in nature notwithstanding the heteroplastic or "giant-cell" tendency of some of the cells (a condition often found in other situations liable to irritation), for these cells showed no sign whatever of any tendency to caseation nor to be attended by lymphocytic deposit.

Whether these changes are due to chemical or purely mechanical irritation may be an open question, but bacterial or toxic influence can be excluded unequivocally.

The appearance of giant or syncytial cells in the course of chronic antro-tympanic changes associated with cholesteatomata bears a striking resemblance to this condition, but it must be borne in mind that middle-ear changes may be due to bacteria or their toxins as well as to cholesterin.

The influence of cholesterin on cell activity has been fully established in many regions; but paraffin, although chemically allied to it, is a more stable substance, and therefore more likely to act mechanically than chemically.

It is impossible to ignore the fact that however stable or "indifferent" it may be, when in the tissues it constitutes a foreign body, keeps the adjacent cells in a state of activity, and is consequently potential for harm. That it is not stationary is shown by changes in the contour of the injection site due to migration of the paraffin, and that the tissues

are not at rest is amply shown by this evidence. Islands of endothelial cells near the paraffin spaces histologically bear a close resemblance to mesotheliomatous formation, and therefore neoplastic "*in posse*."

*Note (by Dan McKenzie).*—The tissue described above by Dr. Wingrave was removed from the ala and point of the nose of a young man who had elsewhere received the paraffin injection ten years previously for a deformed nose. This was the fifth time he had been operated on for its removal, his perseverance being due to the fact that the "lump" gave rise to an intolerable feeling of cold, especially in the winter-time. The removal proved to be extremely difficult and tedious, as the paraffin mass, broken up as it was into tiny globules embedded in a tough, fibrous sponge, could only be removed in small bits along with the fibrous mesh in which it lay.

Of his five operations, three were performed by the writer. At first, with the object of avoiding an external scar, I made my way into the paraffin areas by an incision concealed within the vestibule of the nose as one does in the operations for building up a depressed bridge, the paraffin being attacked with curettes and forceps. But this method proved to be unsatisfactory. The greasy nature of the paraffin combined with the toughness of the fibrous tissue prevented the forceps from holding on once a grip was taken, with the result that an hour's hard labour was represented by a very small product.

Finally, at the patient's urgent request I made an external incision, and by undermining the skin with a sharp knife contrived to dissect out a great part of the solid paraffin-fibrous tissue mass in the subcutaneous and deeper layers. But nothing short of a reflection of the whole cutaneous covering of the nose and a formal dissection of its paraffin-permeated layers would radically extirpate the foreign material, which in the course of time has spread about in all sorts of directions.

#### REFERENCES.

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- (2) STEWART, M. J.—"Occurrence of Irritative Giant Cells," *ibid.*, vol. xvii, 1913.
- (3) ROUSSY, GUSTAVE.—"Sur les Reactions Cytologiques produits dans les Tissu," *Comp. Rend. Soc. de Biol.*, Paris, 1913, t. lxxv.
- (4) WINGRAVE, WYATT.—"The Pathogeny of Cholesteatoma," *Trans. Roy. Soc. Med.*, July, 1910.

## CLINICAL NOTE.

### A PECULIAR NEURO-GASTRIC SYNDROME CURED BY THE SUBMUCOUS RESECTION OF A DEFLECTED NASAL SEPTUM.

By JAMES B. HORGAN, M.B., Ch.B.,  
Cork.

IN December, 1915, the writer was consulted by P. L.—, a male, aged forty, for deafness, which had latterly become worse, tinnitus, frequent colds in the head and headaches which had occurred approximately every three months for many years.

This headache, which was frontal in origin, and radiated all over the head, usually lasted about half an hour, during which time the patient was unable to walk straight. At the end of that time vomiting set in, and after the stomach had got rid of any food contents, "several

pieces of stuff resembling the white of an egg," were ejected. The headache then ceased. Examination showed some evidence of chronic middle-ear catarrh, a marked deflection of the cartilaginous and bony nasal septum to the left and some posterior lower turbinal hypertrophy.

The whispering voice was heard at 8 in. by the right ear, and the conversational voice about 1 ft. by the right ear. There was some diminution of the upper tone limit and bone conduction was bad. The heart, lungs, and kidneys were quite normal.

In the same month a submucous resection of the nasal septum was performed, and the lower turbinal hypertrophies were suitably reduced.

I did not see this patient again until May of this year when he reported to me that his tinnitus had disappeared, and his hearing had slightly improved, although no direct aural treatment had been carried out. He further stated that his tendency to "catch cold" had become very much less, and that his headaches, with their attendant peculiarities, had not once occurred since the operation was performed.

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## SOCIETIES' PROCEEDINGS.

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### ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

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*Meeting on November 16, 1917.*

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*President: H. J. BANKS-DAVIS, M.B., in the Chair.*

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**President's Address.**—H. J. Banks-Davis (see p. 321).

#### **The Report of the Committee of Otological Research.**

The Council of the Section of Otology appointed a Committee to organise otological research.

(A) The Committee considered the question of the exchange of cases, and agreed that:

Any member of the Section who has undertaken to investigate cases of a certain type, and who desires material, should apply to the Committee, and other members will be informed on the Agenda Paper and at the meetings of the Section, and will be invited to send such cases or notes to the investigator.

The difficulty of standardising the tests for hearing was recognised as very great, but it was decided that greater detail of the tests for hearing used should be given in the reports of cases.

(B) A scheme for the tests of hearing was discussed and drawn up as follows:

R.

CONVERSATIONAL VOICE.

L.

Single words or sentences with opposite ear closed.

Distance from ear expressed as a fraction with distance at which voice is heard from normal ear as denominator.

## WHISPER.

Conditions as above, but whisper produced by residual air after forced expiration.

It is recognised that the voice tests are approximate only, as it is impossible to devise an exact standard. The words or phrases used to be recorded when possible.

## WATCH OR POLITZER'S ACQUOMETER.

Distance from ear expressed as a fraction with distance at which watch is heard by a normal ear as denominator. The acquometer should be held strictly vertically.

## TUNING-FORK TESTS.

*Lateralising Test (Weber's).*

Base of vibrating fork to be firmly pressed on mid-line of forehead, and patient asked on which side it is more distinctly heard.

*Relative Bone- and Air conductor (Rinne).*

The vibrating fork is alternately pressed firmly on the mastoid and held with limbs vertical and vibrating in coronal plane close to the meatus, the position in which the tone is heard longer being noted.

*Absolute Bone-conduction (Schwabach and Bing's Tests).*

In these tests the perception of a tuning-fork pressed on the mastoid of a patient and of a normal observer is compared—(1) with the meatus open (Schwabach), or (2) with the meatus closed lightly by the finger (Bing). The difference of the duration of perception expressed in seconds between the ears of observer and patient is noted.

*Tone Range.*

- (1) (a) Upper limit of air-conduction by Edelmann-Galton whistle or steel monochord (gauge of wire to be stated).
- (b) Upper limit of bone-conduction by steel monochord.
- (2) Lower limit of air- and bone-conduction by tuning-forks.

In all tuning-fork tests the number of vibrations per second, and whether single or double, and the make of fork to be stated in each case.

(C) The method of preservation of specimens recommended :

The subject should be kept in an ice-chamber after death, or wool soaked in formalin placed in each ear, and at the *post-mortem* both temporal bones should be removed by a sharp chisel, the superior semi-circular canal opened, and the specimen placed in a 10 per cent. solution of formalin (40 per cent.).

Investigators are referred to the Committee if they require further information.

EDWARD D. DAVIS, }  
SOMERVILLE HASTINGS, } *Hon. Secretaries.*

October, 1917.



**Cystic Swelling Occluding the Right Cartilaginous Meatus; ? Dermoid Cyst.**—**H. J. Banks-Davis.**—The patient is a boy, aged eleven. The swelling, which is on the anterior and lower meatal wall, is elastic, and a speculum can be passed beyond it, revealing some secretion from the dermoid cyst. There appears to be a fine scar over the swelling, and the parents say that six years ago the boy was taken into the infirmary "and kept there six weeks after an operation." Present symptoms are deafness and tenderness when the swelling is pressed. The photograph of the auricle, taken by Dr. Morton, clearly shows the site of origin of the cyst, which at first sight looks like a polypus which has become epithelialised.

Mr. E. D. D. DAVIS: It might be a sebaceous cyst. I have seen two in that position, one of which I dissected out.



The PRESIDENT (in reply): What I first took to be a thick middle-ear discharge was really secretion from the cyst, which had ruptured near the membrane. The scar of an old incision over the swelling is apparent, but as the cyst was not dissected out it has slowly refilled. I have never seen a dermoid cyst in this region before; speaking generally, when a sebaceous cyst has suppurated it ceases to exist, but this does not apply to dermoid cysts wherever situated.

**Green Pea Removed from Middle Ear by Post-aural Operation.**—**H. J. Banks-Davis.**—The patient was a boy, aged ten. A fortnight ago an attempt was made in the Casualty Department to remove a supposed foreign body, which the boy stated he had pushed into his ear. After a long examination nothing could be found. The boy developed facial paralysis, and was lately admitted into the hospital. Yesterday I opened up the middle ear and extracted a large pea with the husk complete—as shown in the specimen. It is very much swollen and looks as large as a hazel-nut.

In 1913 I exhibited a case of a boy, aged nine, where a mastoid operation was performed for prolonged otorrhœa (six months' duration),<sup>1</sup> and where I removed a horse-bean from the middle ear. The presence of a foreign body was never suspected. The entire mastoid was necrosed, and the facial nerve and digastric muscle, bathed in pus, were seen lying at the bottom of the wound. Facial paralysis was present.

In 1912 I exhibited a case where a foreign body was retained in the nose for *fourteen years*. It was a grain of Indian corn, which was germinating. A child had pushed this up her nose instead of giving it to her canary,<sup>2</sup> and there it had remained impacted in the olfactory cleft.

**A War Injury of the Ear.**—E. D. D. Davis.—Private McI—received a shell-wound of the left malar region immediately in front of the ear on September 6, 1917. There is slight trismus due to injury to the mandible, and loss of sight of the left eye. The left external auditory meatus shows some granulation-tissue in the outer half of its roof, and there is a healing perforation of the posterior inferior quadrant of the drum. The loss of hearing is very considerable, and the results of hearing tests are :

R.	L.
Watch . . . . .	$\frac{0}{100}$
Conversational voice . . . . .	$\frac{1}{2}$ ft.
Whisper . . . . .	25 ft.
Lateralisng test (Weber) :	0
+ 512 d.v. . . . .	—
Relative bone and air (Rinne) :	—
512 d.v. . . . .	—
Absolute bone conduction (Schwabach) :	
512 d.v. . . . .	— 2°
256 d.v. . . . .	— 7°
Tone range :	
Upper limit, air and bone . . . . .	1024 d.v.
Lower limit, .. .. .	32 d.v.
Inflation . . . . .	No improvement.

The nose shows injury in the left middle turbinal region with a dark antrum, but syringing of the antrum produced no pus.

"The case illustrates a type of injury in which the deafness is considerable and usually permanent."

Mr. SYDNEY SCOTT: It would have been interesting to have known the result of testing with the monochord in this case, for there appears to be something anomalous in the loss of high tones if the upper limit is 1024 d.v. per sec., and the almost negligible loss of bone-conduction. From the man's manner, too, I suspect the apparent state of hearing is influenced by temporary psychological impressions, and doubt whether the apparent state of hearing is real.

Lieut.-Col. P. GOLDSMITH: The monochord findings as to the bone-conduction of this case would have been helpful; furthermore it might have been useful to determine how he reacted to the fatigue test with tuning-forks and the noise apparatus. It is not impossible that this soldier had a chronic middle-ear suppuration, which has since cleared up. The situation of the wound and the probable course of the bullet is not one likely to cause a tympanic wound, though bullets have a curious way

<sup>1</sup> JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxvii, p. 681.

<sup>2</sup> *Ibid.*, vol. xxvii, p. 317.

of inflicting damage, as you have all seen in war wounds. If he had an old middle-ear lesion one could readily understand his deafness being increased, though the drumhead was healed. I suggest that the after-history of this case be recorded at some future time, and additional tests undertaken to eliminate a functional element, which I cannot help thinking largely predominates.

Mr. E. D. D. DAVIS (in reply): The man has improved very much: the granulation-tissue in the roof of the meatus has gone, and the perforation in the posterior quadrant is healing. There was considerable suppuration when I first saw him.  $\frac{0}{100}$  means he does not hear the watch at all; my watch is heard at 100 in. from the normal ear. The normal ear hears my voice at 25 ft. As the tests were done hurriedly in the out-patient room on the first occasion, they were repeated. They may be a little inaccurate. He had suppuration in the right ear some years ago, but there is not much loss of hearing. Though the suppuration of the left or injured ear has cleared up, there has not been any improvement in the hearing. With regard to the case being permanent, I have seen a number of cases of injury in the mastoid and malar regions, as well as to the base of the skull, and I have watched them for a long time, during which they have made no progress in hearing at all. It is not like concussion-deafness, in which there is improvement within six weeks or two months, or a case of ruptured drum, in which improvement will set in as soon as the rupture has healed. I do not think there is a functional element in this case. I have tried to catch him out, but have not employed a noise machine. The injury was obvious, because it went across the roof of the auditory meatus. I will try to follow up the case, and make a further report.

**Cholesteatoma exposing the Lateral Sinus.—Somerville Hastings.**—A woman, aged thirty-three, was first seen by the exhibitor in July, 1917. She gave a history of chronic discharge from the right ear for eight years, and of pain in this ear of a few weeks' duration. She stated that she had never had any operation on the ears. The right ear was filled with pus and epithelial debris, and when this was removed a large smooth-walled cavity was exposed, all trace of the membrana tympani and ossicles being lost. The walls of this cavity were ulcerated in places, and posteriorly for about  $\frac{1}{2}$  in. the lateral sinus was exposed. Its pulsation was at first much more clearly seen than it is to-day. The patient hears fairly well with the left ear (Politzer's acoumeter 10 ft.), but the hearing in the right ear is very defective. With the noise machine in the left ear no tuning-fork is heard by air-conduction,  $C_{2048}$  is not heard on the mastoid, but  $C_{512}$  and  $C_{64}$  and  $C_{32}$  are. There is much scarring of the posterior wall of the pharynx, which is said to be the result of scarlet fever when a child.

Dr. W. HILL: The interesting feature here is the abnormally forward position of the sinus. I think it is just under the field of operation when removing the posterior wall of the meatus. I once operated upon an exostosis by a post-auricular incision, and I only dealt with the excrescences of bone, as I supposed it was a hyperostosis. After using the chisel there was very profuse hæmorrhage from the lateral sinus. I packed it with gauze, and it all healed up without troublesome sequel until the man came again with the repetition of the hyperostosis. I had told him it would not recur. I used a burr and took the bone away from the roof this time, and there was no further trouble. The sinus in that case was on the bone.

Mr. W. M. MOLLISON: I hope it is not suggested that if cholesteatoma is found no operation may be needed; only when there is such a large hole as in this unusual case can one scrape out the cholesteatomatous cavity through the meatus? I showed a somewhat similar case, in which a cholesteatoma had performed the radical operation, but had eventually caused suppuration and formed a sinus by ulcerating through the mastoid; it had also exposed the dura of the middle fossa and the lateral sinus, and had caused a fistula in the external semicircular canal. It would not be safe to leave that case without operating, even though drainage through the meatus was very free.

Mr. SYDNEY SCOTT: This is an excellent example of a cure resulting from Nature's method of performing the radical mastoid operation. Mr. Mollison showed us a similar case some time ago and we meet with others occasionally, but Nature's ways are so slow and uncertain that I feel we are justified in adopting the more expeditious methods of the surgeon which aim at attaining the same result.

Lieut.-Col. P. GOLDSMITH: I recently operated upon a temporo-sphenoidal abscess. The man had been operated upon some time before, in France, and very few notes were made on the case. On opening the mastoid on this second occasion, the lateral sinus was found far forward and the antrum had not been opened at all, and the greater part of the disease was inside.

Dr. WYLIE: I differ from Mr. Somerville Hastings in regard to this case, because I believe it requires to be opened up behind, and looked into. It would then be found there are many cells, filled with cholesteatomatous matter, and overhanging edges of bone. Unless this is carefully cleaned out, it will re-form in two or three months.

Prof. URBAN PRITCHARD: I suggest for use in such cases as this the little sideways syringe which I showed here some time ago. It clears out these cavities thoroughly.

Mr. SOMERVILLE HASTINGS (in reply): I believe this case has not been touched for three weeks. I saw it for the first time three months ago, and I wrote asking the patient to come to the hospital, with a view to showing her to the Section, three weeks ago. I then cleared away a little *débris*, but nothing has been done to the ear for the last three weeks, and to-day the ear is quite clean, as you see. I think it would be meddlesome surgery to do anything to the ear as it is now, for no operation would improve the condition. The ear requires clearing out every few months, but so does an ear after a mastoid operation. I still feel that this is one of the few cases of cholesteatoma which need no operation.

**Case of Complete Deafness and Complete Loss of Labyrinth Function; ? Cause.**—W. M. Mollison.—This man, aged twenty-one, was in the Army till eighteen months ago when he began to be deaf. He was a driver in the R.F.A. He underwent a mastoid operation on the right side in a military hospital; since then there has been slight right-sided facial paralysis. Examination of the ears shows the right meatus somewhat narrowed as a result of the operation, the scar of which is seen within the hair margin behind the mastoid. The tympanic membranes appear normal. Deafness seems to be complete both for air- and bone-conduction. The man speaks as though quite deaf. He says he could hear the guns during recent air-raids, but he probably only felt the concussion. Similarly he states that he can hear a loud fork placed on the head, but he "hears" it equally well if placed on his hand. The



labyrinth appears functionless. Syringing with cold water for some time produces no sensation of giddiness, nor does any nystagmus result. Rotation in a chair similarly fails to produce vertigo, nystagmus, or pointing error; after fifteen turns the patient could walk well except for one slight stagger, which may have been due to stepping off the chair after having the eyes closed.

Mr. MOLLISON: The loss of function in the labyrinth is not complete, and I take it his deafness is probably functional. The question then arises how to restore that function. I saw yesterday a girl who had been injured in an air-raid. She was deaf in the right ear, though to external examination the ear appeared to be normal. She could not hear conversational speech close to the ear. I syringed the ear and produced labyrinth reaction, and suggested she would hear, and she did. I tried the same treatment on a wounded officer who had been shot through from in front of the right ear, and the missile came out in front of the left ear. He is absolutely deaf, but to external examination his right ear is normal. He had a very good caloric reaction in the right ear. I suggested to him that he would improve, but there is so far no improvement. Later, suggestion under light ether anæsthesia failed to cause any response.

Mr. J. F. O'MALLEY: I had two cases of functional deafness, in neither of which was there any lesion. They were patients who had undergone very severe exposure to shelling in the trenches, and the men were taken back totally deaf. I was able to get each of them to hear quite well in a few minutes. I had a large vessel of cold water, and ran the cold water down in the ordinary way into the ear until very profound vestibular disturbance resulted, and after that I shouted loudly down a large speaking-tube, then conversed in the ordinary way, and they answered me. The vestibular disturbance was carried out until a profound response was elicited.

Mr. SYDNEY SCOTT: Methods somewhat similar to those mentioned by Mr. O'Malley are adopted at the National Hospital, where we see patients with different forms of war deafness, injuries and neuroses. Anomalous responses to hearing tests occur similar to those described to-day by Mr. Mollison and Mr. E. D. D. Davis, for I suspect Mr. Mollison's patient so far as his left ear is concerned. He has a genuine defect in the right ear, and probably this suggests deafness in the other. Whether he persuades himself he is really deaf or whether he is only trying to persuade others that he is "stone deaf" I do not know, but I should feel greatly surprised if he could not be cured by the methods referred to. We have probably all seen numerous cases of "stone deafness" due to war conditions completely cured. Recently a young pensioner who had been drawing a pension for deafness for fifteen months was cured in as many minutes, so that he could hear a whisper at 20 ft., and stated he wished to "rejoin the Army and go out to his 'pals,' some of whom were still out there." This man had a fine physique, and had been awarded a medal for bravery on the field; he had been blown up, and afterwards experienced the symptoms attributed to shell-shock. He became "stone deaf" in both ears, and had begun to lip-read. The drums were intact. He said he heard nothing by air- or bone-conduction. But his vestibular tests showed that the vestibular nerve was intact. Moreover, he varied the loudness of his voice when reading aloud if the noise-machine was introduced into the ear. Such inconsistency is common in these neuroses (and malingering may be a form of neurosis). We were justified by the result, in suspecting this man, in spite of his bravery and fine physique, of not having genuine deafness. We assured

him he would be cured, and he readily yielded to loud whistles, speaking-tubes, and a little faradisation.

**Myiasis of the Ear—Larva of the Flesh Fly.—E. B. Waggett.**—This is the only case of myiasis of the ear I have heard of during twenty-three months' campaign in Macedonia. It occurred in a Greek muleteer who was sent to the field ambulance on June 4 for removal of aural polypi. He had been treated by syringing for three days. On admission the patient was in great agony. Examination showed discharge from the right ear, which was blocked by some smooth pale objects. Two larvæ, one dead and one living, were removed with forceps. A deep circular ulcer, about the size of a threepenny-piece, with pouting, undermined edges, was present on the posterior meatal wall and half an inch from the membrana tympani. The latter showed a small perforation near the centre. Relief was immediate and healing rapid.

I subsequently learnt through the interpreter that the patient had had a slight discharge from the ear following an attack of earache a month previously. Five days before admission he was awakened from his midday sleep in the Struma Valley by the presence of a fly in his ear. This escaped. Pain persisted, and he woke at 2 a.m. next morning in great pain. Vertigo was present, but no deafness. He heard the sound as of a watch ticking in his ear. Severe pain persisted until the date of his admission; this was worse at night and not paroxysmal.

The living larva measured  $\frac{5}{10}$  in. in length, and exhibited such amazing vigour and activity that its mere presence in the ear must have caused intolerable distress. The growth reached by the larvæ in the course of five days explained the size and depth of the excavation in the meatal wall. For two days the creature ceaselessly raced round the glass vessel in which it was imprisoned, taking no notice of raw meat supplied for its nourishment. At the end of two days it pupated, burrowing into a ball of moist blotting-paper in preference to a lump of meat and a roll of dry straw put there for its choice. At some date between August 7 and September 12 the imago emerged—that is to say, after a period of pupation not less than eight weeks and not more than thirteen weeks. The larvæ were of the ordinary acephalous type, tapering to a point in front, without whorls of hooklets as in the screw-worm. I enclose the pupa-shell *in situ* and the adult specimen of flesh fly, *Sarcophaga carnosus*.

(To be continued.)

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## THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

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Meeting at Chicago, June 15 and 16, 1915.

(Continued from p. 395, vol. xxxii.)

**Hemi-laryngectomy for Malignant Diseases: Description of New Operation, with Report of Six Cases, all recovered.—John E. MacKenty.**—The author presented a method by which he endeavours to make the closed operation as safe as the open one, without the difficulties and defects of the latter. Hemi-laryngectomy stands midway between total laryngectomy and thyrotomy as a surgical choice.

Thyrotomy takes the early cases of laryngeal cancer, hemi-laryngectomy the later ones, and total resection the latest (or, as one might better say, the too late) ones. The statistics of recurrence are in corresponding ratio, thyrotomy leading and total laryngectomy bringing up a sorry rear. Gluck's method of hemi-laryngectomy is a roundabout and tedious one, and has, furthermore, the disadvantages of permitting wound secretions readily to enter the trachea, and of giving some trouble later in converting the fissure into a potential tube. Yet a primary closure of the larynx, without some way of safeguarding the trachea against wound secretion, would be a grave surgical blunder. These considerations, therefore, prompted the author to attempt a modification in the accepted technique.

*Operation.*—The larynx should be first opened for inspection, if there is a question as to whether thyrotomy or hemi-laryngectomy is indicated. Then, if hemi-laryngectomy is elected, the trachea is opened just above the sternal notch. One incision is made for the laryngectomy and another for the tracheotomy. The first incision begins well up under the chin, and extends to a point just below the cricoid ring in the middle line. This is deepened until the thyro-hyoid membrane, the thyroid, and the cricoid cartilages are exposed. Care is taken not to separate the tissues laterally. The larynx is then opened in the middle line, its interior cocaineised and inspected. Blunt hooks or retractors are used in order to avoid injury to the edges of the cartilage, especially on the healthy side.

The trachea is next opened as low as possible. The second incision is here made over the end of the sternal notch, and up to within 1 in., or more if possible, of the first incision, leaving a liberal bridge of tissue between the two incisions. The trachea is opened and a large tracheal cannula inserted. Into this is fitted a rubber tube, 18 in. long, through which the anæsthetic is continued. Before inserting the tracheal cannula, two stout silk threads are passed through the edges of the tracheal incision, one on each side, and laid one on each side of the neck. The wound is then closed fairly close up to the cannula. The object of the silk threads is to control the tracheal opening in case the tube should get displaced or come out. Traction on these threads opens the trachea. This precaution should always be taken in low tracheotomies.

The larynx is again opened with blunt hooks or narrow retractors. The trachea is cocaineised and loosely packed with gauze. The patient is placed in a semi-Trendelenburgh position. The skin, cervical fascia, and pre-tracheal muscles covering the diseased half of the larynx are carefully dissected away from the cartilage, care being taken to keep them all in one flap and not to injure the inner surface, which is composed of the pre-tracheal muscles, as this surface is to form the new laryngeal wall. This flap is gently held away while the removal of half of the larynx proceeds. The thyro-hyoid membrane is slit laterally, and the trachea divided below the cricoid ring on the diseased side. Iodoform gauze is packed into the pharynx, and is removed through the mouth when the operation is near completion. The loosened half of the larynx is now retracted, well away from the middle line. If the mucous membrane over the posterior commissure and arytenoid is healthy, it is saved and lifted away from the cartilage beneath. This mucous membrane dissection is carried backwards over the posterior surface of the arytenoid and down towards, and sometimes into, the anterior aspect of the mouth of the œsophagus.

The diseased half of the larynx is now removed in the usual way, care being taken to save the mucous membrane flap outlined above. All



bleeding points are controlled by catching only the vessels and by tying with an 00 iodised catgut. Careful hæmostasis and gentle treatment of the tissues are required.

As much as possible of the raw surface left by the hemi-laryngectomy must now be covered with mucous membrane. The above-mentioned flap is brought downward and inward. Care should be taken to avoid tension in stitching the flap in its new position with fine, iodised gut. The tracheal packing is now removed and the trachea cleared of blood-clot down to the cannula. A long strip of vaselined gauze, thoroughly impregnated with bismuth, is packed into the trachea. The end of the strip is brought out at the lower end of the laryngeal incision. The larynx is packed loosely with a strip of iodoform gauze, the end of which is brought out at the same point as the tracheal packing. The gauze in the pharynx is removed through the mouth and the feeding-tube is pushed through the nose and directed into the œsophagus.

The mesial edge of the pre-tracheal muscles is now united to the mucous membrane of the healthy side of the larynx along its anterior median aspect, using fine iodised gut. The skin edges are united with silkworm gut. The wound is left open at its lower angle, wide enough to give drainage soon for the gauze ends. Two provisional stitches are placed here to be tied after these strips are removed, thus entirely closing the larynx. A sheet of rubber tissue, covered on both sides with gauze, is glued by its edges with collodion to the neck, across the bridge of skin separating the two wounds. This attachment should extend laterally one half-way around the neck to keep the drainage of the laryngeal wound from the tracheal cannula.

As after-treatment Dr. MacKenty prescribed a diet of oatmeal thoroughly cooked and strained, mixed with milk, milk-sugar or raw egg, and occasionally with melted butter. Six ounces of this mixture is forced through the œsophageal tube with a piston syringe every four hours, followed by 4 oz. of water.

To clear the trachea of secretion, suction is used as needed. A small catheter is passed down to the bifurcation and about 10 lb. of negative pressure is applied. Dressings should be changed every few hours. The laryngeal drain should be kept in as long as the serous flow continues. The tracheal plug may remain from three to five days. The tracheal cannula should be removed just as soon as the new larynx is open for comfortable breathing.

Dr. JOHN F. BARNHILL thought the method described would undoubtedly prove advantageous in the very early cases in which it was possible to make a diagnosis. The new feature of the method was the forming of a cavity lined by mucous membrane. This, of course, would presuppose the presence of good membrane to be used for this purpose. For this reason the method was applicable only in cases in which the disease was not very extensive. If Dr. MacKenty had not had six recoveries in his six cases he would have been open to the criticism that he should have done laryngectomy. Semon, Butlin, and others who had done a great deal of this work had reported better results with laryngectomy than with hemi-laryngectomy. With the modern methods for keeping the secretions out of the larynx it was possible to do more than might be done otherwise. Crile, who had done a good deal of this work, advised doing two operations, the first being a low tracheotomy, for the purpose of getting the patient accustomed to the tube. In Dr. MacKenty's method that was not necessary, as he succeeded in keeping the secretions out of the trachea, so that there was no danger of the fluid



dissecting its way down into the mediastinum, as happened in many cases. He asked if there had been stricture in any of Dr. MacKenty's cases. In case there was not enough mucous membrane to cover the wound there might be stricture after removal of the tube.

Dr. MACKENTY replied that one case had refused total laryngectomy. He had not had any post-operative strictures. He did not think the Semon operation applicable in any of his cases. He got enough mucous membrane to cover one-quarter or one-third of the wound in most of the cases, as he had stated in the description of the operation. He was opposed to the two-stage operation. It was not done abroad, and he did not see why it had to be done here. In going in for the second operation it was necessary to go through a septic field. In total laryngectomy he believed in the complete operation, *i. e.* with the gland-bearing tissues of the neck. In one case there was a fairly tight point below the larynx, because he had to do more than a hemi-laryngectomy. Moreover, the patient had a distorted trachea from the enlarged thyroid. Answering the question about the perichondrium, he had always taken the mucous membrane without perichondrium.

**Cleft Palate and Hare-lip.—Owen Smith.**—Careful study of the operative technique for cleft palate reveals three distinct methods with minor modifications:

(1) Elevation or separation of the soft tissues of the palate, and suturing the denuded edges in the middle line, as advocated by Langenbeck and Warren.

(2) Flap elevation, reflection, or rotation, as advised by Lane.

(3) Forcible closing together of the cleft by lateral pressure and retaining the parts in place by heavy metal sutures, as suggested by Brophy.

Having operated upon more than 200 cases, and having carefully tried all three plans, the essayist unreservedly commended the second method suggested by Lane. The most important reason for an early operation is that a large number of these patients die before they reach the age when they would be ready for operation by the older methods. His own experience leads him to the belief that 50 or 60 per cent. die of inanition within the first six or eight months of infancy if the cleft is not closed. The mortality from early operation by the older surgeons was so great that they were forced to abandon it. In contradistinction, Lane and Brophy did not have any large percentage of deaths from their work, and in his own series by their methods he had not had a fatality. The sooner after birth the operation is performed the less will be the hæmorrhage, while the shock to the nervous system will be very slight. The muscles of the throat after the early operation begin their activity at once, and do not have time to atrophy. This atrophy takes place where operation is delayed, and the Eustachian tube suffers from this disuse of the muscles. The early formation of a fibrous band between the edges of the cleft by contraction begins at once to mould the twisted face into its proper position. Before the teeth erupt an opportunity is offered to get a wider flap by extending the incision outside of the alveolus. The immediate repair of the lip adds another factor in restoring the palatal processes to their normal place. Lane's operation is designed to bridge over the cleft by means of muco periosteal flaps from the bony palate in front of the mucous membrane and submucous tissue from the muscular or soft palate behind. Flaps properly formed when placed in position over the cleft

present their raw surfaces together, one overlapping the other. Fine silk sutures are used, and when tied they unite the flaps in this way and form a new, strong, and complete palate. It has been the essayist's practice, in order to hasten the healing, to curette the ulcerated free border of the septum, often found at birth, and to dissect up the mucous membrane on both sides until material enough is obtained for a flap, which is pulled down and sutured over the free edge of the curetted septum. It is never safe to operate while the ulcer is present. For some time he has thought it wiser to divide the operation into two sittings, particularly if the cleft is very wide. The technique is described in detail.

The hare-lip operation employed by the essayist is designated as the lip-splitting method. In this operation there is no sacrifice of tissue, and the lip may be operated upon as many times as necessary until the desired effect is obtained.

Dr. JOHN EDMUND MACKENTY said Dr. Smith had improved upon the Lane operation. The objection he had had to the Lane operation was that it called for the splitting of the soft palate into two parts, more or less completely ruining it as a functioning organ. He would try out Dr. Smith's method in future. He had never done a hare-lip operation without undermining the tissues of the lip so as to relieve tension at the edges. It was not quite clear to him that tension would be relieved by Dr. Smith's method. It had not been his experience that such a large percentage of cleft-palate patients died. He would like to hear more about the speech results in the Smith method, and it was to be hoped that Dr. Smith, in future papers, would tell of the speech results in his cases. He had used an obturator in the mouth to prevent tongue pressure, and had obtained better results when he did this. Most of his operations had been done by a modification of the Langenbeck method.

Dr. TRUMAN W. BROPHY said there were so many varieties of defect that it was difficult to discuss a paper on this subject. He classified hare-lip under thirteen forms, and cleft palate under fifteen forms. He presented charts showing illustrations of the various forms. In discussing cleft-palate it was necessary to consider the different kinds, because there were nearly as many different kinds of treatment as there were congenital defects. The object in operating upon the palate was two-fold: First, to overcome the congenital deformity, to restore the parts just as nearly as possible to normality; second, to correct the condition so as to enable the patient to speak properly when the age of speech was reached. The surgeon who failed to accomplish this failed to attain success. A cleft palate was like an open wound. A surgeon would not make a patient wait before closing an ordinary open wound, and yet many surgeons made patients wait for years before closing a cleft palate.

Dr. GEORGE L. RICHARDS (Fall River) said, in justice to Dr. Smith's method, that he had a case under observation which corresponded to Dr. Brophy's Form XIII. The patient had a good lip, a good palate, and was developing a very good voice. One would hardly know the patient was not a normal individual.

Dr. SMITH, in closing the discussion, did not dispute Dr. Brophy's ability to do anything with wires. In order to pass a verdict upon the two operations, one should try both. Every case in which he had employed the Brophy operation had been an absolute failure. Dr. Brophy obtained the desired object by one method, he obtained it by another. He had no desire to criticise the Brophy operation. In the

method described there was an immediate formation of fibrous tissue which drew the parts together, if taken early enough. One could obtain any desired length of palate by taking a little care in placing the flaps before beginning the sutures.

**Some Observations on Turning Nystagmus.—George W. MacKenzie.**—The author's investigations covering a period of eight years (1906 to 1914) have resulted in findings contradictory to those of Bárány on after-turning nystagmus. He believes the observations of the latter have been faulty because of inaccurate technique, and also that the wide discrepancies in the duration of after-turning nystagmus in normal individuals, claimed by Bárány, do not exist. Hence the author concludes that the hearing test is a valuable one in the diagnosis of labyrinthine conditions.

The author examined 117 cases in all, including nine normal individuals. The list included nearly all of the varieties of ear diseases to be met with in the average practice. They differed from Bárány's in the following particulars.

In normals, Bárány found the average duration of horizontal after-nystagmus to the right after ten turns to the left was forty-one seconds. The author found that the average duration of horizontal after-nystagmus to the right after ten turns to the left was a fraction of a second less than twenty-four seconds. Bárány found that the average duration of horizontal after-nystagmus to the left after ten turns to the right was thirty-nine seconds, and the author found that it was only twenty-four seconds. Bárány: The maximum duration for horizontal after-nystagmus to the right after ten turns to the left was ninety-eight seconds; the author: Twenty-nine seconds. Bárány: The maximum duration for horizontal after-nystagmus to the left after ten turns to the right was one hundred and twenty seconds; the author: Thirty-one seconds. Bárány mentions one case with no nystagmus after ten turns and uses this as his minimum for after-turning nystagmus. The author observed two cases with apparently no nystagmus, but upon repeating the test and turning the patient at a more rapid speed, and examining carefully, he was able to note and time the nystagmus, when it was found to be of relatively short excursions and lasted the usual length of time. Bárány observed horizontal after-nystagmus averaging forty seconds in sixty individuals examined on different days. The maximum was eighty seconds; minimum, twenty-five seconds. One-fifth of the cases showed consistently the same findings; in other words, four-fifths showed variable findings. The author examined a smaller number of such cases and found the average after ten turns for horizontal after-nystagmus to equal about twenty-four seconds. The greatest variations were but a few seconds and these could readily have been explained on the ground of faulty observations. In a number of cases in which Bárány tried both rapid and slow turnings, he has found that after ten rapid turns the nystagmus lasted from eighteen to nineteen seconds, while after slow turns it lasted from twenty-six to thirty seconds. In one-half the cases he found the rapid turns produced a longer after-nystagmus than slower turns. The author tried patients with both rapid and slow turnings with the result that the duration is apparently less after slow than after rapid turns and consistently so. However, most careful tests will show them to be about equal in duration. The difference is more apparent than real for the reason that after slow turning the nystagmus is less intensive than after rapid turning, hence less noticeable and more difficult to determine the moment.



of cessation. Bárány claims that with a great number of persons the horizontal nystagmus after twenty, thirty, forty, fifty, and sixty turns was the same as after ten turns, adding that it appears that in the average ten turns show the highest rate, while with a greater or less number of turns the amount diminishes. The author admits that he is not in the position to match Bárány in material, but he performed some auto-experiments of this kind and found the nystagmus to increase consistently in duration between ten and twenty turns. He found, furthermore, less variations after twenty than after ten turns. Bárány claims that the amount of after-turning nystagmus after twenty turns is about equal to that after five turns. The author never found this to be true in a single case in his experience. Bárány claims that after twenty or more turns there appears not infrequently an after-after-nystagmus in the direction opposite to the after-nystagmus, lasting sometimes a minute. The author has never seen an after-after-nystagmus in many hundred examinations, including those in his list. He does not believe it exists, and will not believe it until it is shown to him. Concerning dancers, Bárány claims that with those who habitually turn to the right the duration of the horizontal turning-nystagmus to the left falls considerably shorter than that to the right. The author was fortunate enough to obtain a whirling dervisher with the stage name of Hash Hash, who was a left turner. The author examined him on many occasions and found that his duration of nystagmus was consistently the same on several occasions. The figures were reduced for both horizontal and rotatory nystagmus to both sides and more so to the right. This one case supports the claims of Bárány.

The author further pointed out that Bárány, in his efforts to find a relationship between the semi-circular canals and the eye-muscles, neglected a certain caution that he himself warns against when he advises the use of opaque glasses in studying horizontal after-turning nystagmus. The author attributed Bárány's irregular findings as compared to his own, as due to his technique, which the author believed faulty, rather than to actual irregularities in the behaviour of the reflexes.

In Bárány's "Table for Differential Diagnosis of Mentioned Diseases," p. 276 of the "Proceedings of the Ninth International Otolological Congress, he indicated with arrows the direction of spontaneous nystagmus in the column, suppuration of the right labyrinth since twenty-one days, and elsewhere states that the patient has spontaneous nystagmus to the right as well as to the left. The author remarked that this nystagmus to the right, when looking to the right, is not in the least way connected with the patient's labyrinthine condition, and that Bárány has included it among other findings in labyrinthine suppuration only supports the author's previous contention that Bárány lays more stress upon the side positions than the straightforward position of the visual axis. In Bárány's table there is no mention made of his having noted the spontaneous nystagmus that occurs when looking straight ahead, while the author considered no other nystagmus of any value from the standpoint of the semi-circular canals. When the intensity of the nystagmus does not balance in opposite directions, the author accepts it as pathological and the problem then is the isolation of the particular muscle or muscles involved.

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## Abstracts.

### NOSE AND NASO-PHARYNX.

**The Fossa of Rosenmueller.**—Sidney Yankauer. "The Laryngoscope," December, 1917, p. 861.

Yankauer states that the fossa of Rosenmueller is nearly one inch in depth. The main respiratory air-channel in the nose is on a level with the tip of the Eustachian eminence. When the air current reaches the nasopharynx it divides, and part passes above the eminence through the fossa of Rosenmueller. The second part passes in front of the eminence over the soft palate, and the remainder courses between the two eminences. Any obstruction, such as adenoid growths in the fossa or in the space between them, interferes seriously with the smooth passage of the air. When adenoids become inflamed, the edge of the "lateral comb" becomes adherent to the eminence, and when the lymphoid tissue shrinks during adolescence these adhesions remain. Such adhesions can be easily recognised in the post-nasal mirror. They are sometimes so numerous that the mucous membrane appears to be continuous, and there is no sign of the usual deep fossa of Rosenmueller. Some adults complain of nasal obstruction, and yet no obstruction of any kind is found in the nose. Removal of the adhesions in the nasopharynx in such cases relieves the obstruction. Applications of silver to the raw surfaces may be necessary to prevent the re-formation of adhesions. Yankauer recommends that such applications should be made through his speculum. When healing is complete, the appearance of the nasopharynx is entirely changed.

The presence of secretion in the fossa of Rosenmueller is, in Yankauer's opinion, always suggestive of nasal sinus disease. If there are adhesions between the posterior lip of the tube and the posterior wall of the pharynx, the lower part of the fossa of Rosenmueller is converted into a pocket in which secretion can accumulate. As this secretion may be forced into the nasal cavity during the act of blowing the nose, all the classical symptoms of chronic sinus disease are reproduced. Yet, when the adhesions are cut and the drainage of the fossa restored, all the symptoms disappear.

*J. S. Fraser.*

### LARYNX AND TRACHEA.

**Tracheo-bronchial Diphtheria.**—Henry Linah. "The Laryngoscope," October, 1917, p. 734.

Linah does not consider that a case of diphtheria is tracheo-bronchial in which O'Dwyer's intubation-tube relieves the stenosis. It is only those cases with membrane below the intubation-tube which call for bronchoscopic measures to relieve the obstruction.

Certain conditions may be mistaken for tracheo-bronchial diphtheria, *e. g.* (1) encapsulated empyema which has ruptured into a bronchus; (2) impacted foreign body in a main bronchus; (3) cases of bilateral broncho pneumonia.

Linah uses the smallest-sized tube possible when performing bronchoscopy—usually the 4 and 5 mm. tubes of Chevalier Jackson. Such tubes cause little traumatism, but make the recognition of objects difficult. It is very important to remove the obstruction at the first trial, whether it be a diphtheric membrane or a portion of food, such as a

pea-nut pulp. Linah states that his average time was from five to eight minutes, but the tube may be left *in situ* with no apparent bad result for a period of fifteen minutes after spraying or swabbing with antitoxin. The children breathe with perfect ease and often fall asleep with the bronchoscope *in situ* after the obstruction has been relieved. In the removal of the membrane by suction or forceps care should be taken to locate the uppermost part of the attachment of the membrane and follow it down to its distal attachment. As a rule the membrane is readily stripped off from the tracheal and bronchial wall. During 1915-16 Linah has dealt with 11 cases. Of these, 1 was an adult and all the others children of from one to eight years. Six of the 11 cases were discharged cured. Of the 5 which died, 3 were moribund on admission, while the other 2 died from pneumonia fifteen and twenty days after the removal of the membrane. The reports of the cases are extremely interesting but should be read in the original. No case of diphtheria should ever be anæsthetised for the removal of membrane, though morphia and atropine may be given. It is noteworthy that all the cases Linah has dealt with, in which tracheotomy had been performed, terminated fatally.

J. S. Fraser.

### EAR.

**Unusual Course of Pus in the Neck in a Case of Mastoiditis.**—John W. Durkee. "The Laryngoscope," December, 1917, p. 901.

The writer records the case of a male, aged fifty, who complained of pain in the right side of the head. Six weeks later the pain was so severe as to keep him from business. Otorrhœa began eighteen days after the last note and at the same time a swelling formed behind the auricle. After two weeks this swelling disappeared, but a few days later there was a swelling in the upper part of the neck at the tip of the mastoid. Durkee first saw the patient a month after the discharge began and found sagging of the wall of the right meatus, which was filled with thick pus. Temperature, 98.2° F. The urine contained sugar and a trace of albumen. Incision in the neck opened a large abscess. Durkee states that the pus was external to the sterno-mastoid. There was a necrotic spot in the mastoid cortex over the antrum and from this granulations protruded. From this spot a sinus connected with the upper part of the neck abscess. The mastoid was broken down and filled with pus and granulations. Some deep cells were present below the antrum, between the sigmoid sinus and the bony meatus. The sinus itself and the dura of the temporo-sphenoidal lobe were covered with granulations. Four days later the patient complained of difficulty in swallowing relieved by holding up the larynx. The wound was dressed and thick pus welled up from the deep cells mentioned above. The irrigation passed from these cells into the patient's throat. On swallowing, air came through the deep cells into the wound. Efforts to locate the opening in the throat were without success. Deep fluctuation was now detected low down in the neck behind the sterno-mastoid and a large abscess was opened here. On irrigation of this the solution went into the patient's throat and also came through the deep cells into the mastoid. On May 7 erysipelas appeared around the wound and involved the face and head: death.<sup>1</sup>

J. S. Fraser.

<sup>1</sup> Obviously one of those interesting cases of deep cervical cellulitis opening into the pharynx of which a collection was made in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOL., vol. xxx, p. 12.

**A Method of Medicating Eustachian Bougies.**—Lee M. Hurd. "The Laryngoscope," December, 1917, p. 879.

Hurd recommends the following method: In a narrow test-tube make a saturated solution of gum acacia in a water-bath, then add the silver nitrate solution, making the solution from 1 per cent. to 10 per cent. strength of silver as desired. The bougie is dipped about  $1\frac{1}{2}$  in. into this solution, and when the bougie has a uniform coating it is placed to dry; then Hurd usually gives the bougie a second coating. When dry, the gum acacia and silver coating looks and feels like varnish to the dry fingers. The silver bougies, when kept dry, will last fairly well for a week or more.

*Method of Introduction.*—A plain gum elastic or celluloid bougie, of the proper size, is passed through the tube to make sure of the position of the catheter and the size of the bougie the tube will admit, and also to dilate the tube. Then the plain bougie is withdrawn, and the coated bougie readily passed as far as desired and allowed to remain about two minutes in order that the moisture of the membrane may dissolve the gum and deposit the silver.

*Result.*—One to four per cent. is usually strong enough to contract the membrane; if not, the strength can be increased up to 10 per cent., but these stronger bougies should be used cautiously. Hurd has on several occasions produced a serous exudate in the tympanum with pain, tinnitus, and some deafness for several days. The ultimate results vary. Some tubes remain perfectly patent, while others relapse and require a repetition of the treatment.

J. S. Fraser.

**The Surgical Treatment and Cure of Suppurative Otitis Media Chronica in Childhood.**—James B. Horgan. "Brit. Journ. of Child. Dis.," January–March, 1918, xv.

A *resumé* of the modern surgical treatment of a disease, the prevalence of which the writer is firmly convinced may be ascribed to the indifference with which it is so often treated in its acute or early stages, and at a later period to a lack of thoroughness in ascertaining and removing all sources of tympanic blockage and re-infection.

The opinion is expressed that, at least in the case of children, the radical mastoid operation is too often performed with undue celerity and before other and simpler surgical procedures have been given a legitimate trial.

Another voice cries from the wilderness for the routine aural examination and treatment of children *before* they are discharged from fever hospitals.

*Author's abstract.*

**The Value of the Galvanic Method of Testing the Functions of the Inner Ear and Eighth Nerve.**—G. W. Mackenzie. "Annals of Otolology," xxvi, p. 733.

The author concludes that the galvanic test is more accurate than the caloric or rotational, is least annoying and easiest to control. That it has the additional advantage of being applicable as a unilateral test. That it is the only test we possess for testing the function of the eighth nerve in neuritis or secondary degeneration, and for making a differential diagnosis between labyrinth destruction and eighth nerve neuritis. Finally, it is the only test available for determining the progress of eighth nerve neuritis, whether favourable or unfavourable.

Macleod Yearsley.

## MISCELLANEOUS.

**A Splint for Facial Paralysis.**—C. E. Dennis. "Brit. Med. Journ.," September 21, 1918.

In the case of injury to a motor nerve—for example, the radial (muscular-spiral)—the muscles supplied by it are paralysed, and the contraction of opposing sound muscles, aided in the above case by gravity, when splinting is not resorted to, overstretches the flaccid paralysed muscles.



Where recovery is going to take place it will be delayed and rendered imperfect if this overstretching is permitted to take place. In injury to the facial nerve of one side, with resulting facial paralysis, overstretching of the paralysed muscles will be caused by the contraction of the muscles of the opposite side, especially when the latter muscles are put into use, as in smiling, laughing, talking, and during mastication. Moreover, the sound muscles will be placed at a disadvantage, as their points of attachment are drawn nearer to the point of origin. Not only is one side paralysed, but the sound side is hampered in its range and power of action. Consequently the patient experiences a double difficulty in talking and masticating.

To avoid this, the following simple yet effective appliance has been invented. It consists of a piece of malleable German silver wire, bent



so as to hook into the corner of the mouth and over the ear of the affected side, like the curl side of a spectacle. It is easily adjusted by bending the ear-piece till the tension is correct and comfortable. Its advantages are: (1) Simplicity and lightness; (2) prevention of overstretching of the paralysed muscles, and so rendering recovery more rapid; (3) it gives the sound muscles a fixed point to work against, and by preventing shortening renders them more effective in action; (4) it is greatly appreciated by the patients, who state that they feel more comfortable and can masticate much better. If properly adjusted there does not appear to be any tendency to make the mouth sore, and it is so simple that anyone can easily make the splint in a few minutes with a pair of pliers.

*Dan McKenzie.*

**Double Facial Paralysis of Traumatic Origin.**—G. L. Halley. "Rev. de Laryngol.," January, 1918.

The writer points out that this condition is very rare indeed. Only six cases have already been recorded. The writer adds two cases which he had observed during the war.

**CASE 1.**—Double total facial paralysis of peripheral type of six weeks' duration. Paralysis absolute on left side, on right slight movement of closure of eye. Characteristic face. Absence of expression and wrinkles. Dribbling of saliva. Speech almost incomprehensible. Eating and drinking difficult. Reaction of degeneration on both sides. Mode of production. Head of patient squeezed between cart and wall. Bleeding from left ear. Face swollen and bruised for several days. Lesion attributed to transverse fracture of the base, although both eighth nerves were intact.

**CASE 2.**—Soldier blown up by large shell at Douaumont in October, 1916. Immediate loss of consciousness followed by loss of memory. Sent down from dressing-station labelled "no external lesions, facial diplegia, bleeding from both ears and from nose, slight left mydriasis." During first few days patient again relapsed into coma, and on regaining consciousness complained of intense nausea and vertigo. Quite deaf in the left ear, almost totally deaf in the right. Developed double otorrhea. On examination had typical double facial paralysis. No sign of ocular paralysis nor alteration of vision. Left pupil slightly larger than right. No nystagmus. No trouble with deglutition. Movements of palate normal. Loss of taste in the anterior two-thirds of the tongue. Reaction of degeneration on both sides. Examination of ears showed: Right drum cicatrised. Left drum retracted. Hearing almost completely lost. Diagnosis: Commotio without lesion of vestibular tracts.

Examination, September, 1917: Considerable improvement. Can shut eyes now. Reaction to faradism returned.

The lesion was probably peripheral and localised in the aqueduct of Fallopius. As the sense of taste was affected, probably the lesion was in the tympanic part of the facial nerve. No other nerves were involved.

*J. K. Milne Dickie.*

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## REVIEWS.

*Eye, Ear, Nose and Throat.* By H. C. BALLENGER, M.D., and A. G. WIPPERN, M.D. Pp. 524. New York: Lea & Febiger. Second edition, 1917.

The authors have rewritten nearly every chapter of this volume in response to the demand for a short work for students and practitioners.

They have also added the anatomy of the parts and two extra coloured plates, so that the work is now well illustrated with 180 engravings and eight plates in colour. The section upon the eye and its affections, from the pen of Dr. Wipperfurth, does not concern us here. In England ophthalmology and otology are considered to be specialties of sufficiently large scope to be kept apart. Dr. Ballenger is responsible for the remainder of the book, and has done his work well. For a small text-book the work is an excellent one, and the standard is well maintained throughout. Descriptions are clear, and wherever a good diagram or illustration can be of assistance in explanation of the text there is always one to be found. We would, however, counsel a more rigorous proof-reading in future editions. A useful portion of the work is the part relating to life insurance. This the author divides into diseases which should not bar the applicant, those which render him a doubtful risk, and those which render him an unsafe risk. We agree with most of his decisions, but we fail to see why ankylosis of the footplate of the stapes should be included in the third category.

*Macleod Yearsley.*

*War Otitis and War Deafness; Diagnosis, Treatment, Medical Reports*  
By H. BOURGEOIS and M. SOURDILLE; preface by Médecin-Inspecteur TOUBERT. English translation edited by J. DUNDAS GRANT, M.D. With 31 illustrations and 6 plates. University of London Press, Ltd. Paris: Masson et Cie, 1918.

This book consists of 230 pages with numerous illustrations and diagrams, and is a translation from the French manual by Bourgeois and Sourdille, edited in English by Dundas Grant. It is one of the Military Medical Annuals, the general editor of which is Sir Alfred Keogh. The amount of information this book contains and its value even to the initiated is really astounding.

It is an extremely difficult thing to state practically and concisely the experience that one has personally gained when dealing with otological cases over a period of years, and still more difficult to render these recorded opinions accurately in another language as Dr. Dundas Grant has done, and he deserves the highest praise for the way in which he has translated the work. The fact that it does not *appear* to be a translation from a foreign language gives an added merit to this manual.

The book is well worth reading, and, what is not always the same thing, well worth possessing.

*H. J. Banks-Davis.*

## NOTES AND QUERIES.

### A NEW SYMPTOM OF LABYRINTH FISTULA.

SIR,—In Dr. Mygind's article entitled "A New Symptom of Labyrinth Fistula," which was published in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, and OTOLOGY for May last (vol. xxxiii, part 5, p. 146), he describes certain observations produced in patients with labyrinthine disturbances, as influenced by compression of the carotid artery.

As Dr. Mygind states, "This symptom does not seem to have been described before," I feel sure there are many otologists who will be interested to know that I made similar observations, some of which I described in a paper read before the Otological Section, Royal Society of Medicine, in 1909 and subsequently reported in your journal (see "The Problem of Vertigo—some New Data obtained in a Research into the Functions of the Semicircular Canals in Relation to Movements of the Eyeball in the Human Subject," *Proc. Roy. Soc. Med.*, April, 1909, pp. 65-68).

There I referred to eight cases in which spontaneous nystagmus associated with a defunct labyrinth was arrested by compression of the carotid, and the ninth

case, one of long-standing defunct labyrinth, in which spontaneous nystagmus did not exist, but which was induced by compression of the carotid on the normal side.

London, W.

Yours, etc.,

SYDNEY SCOTT.

#### THE LARYNGOLOGY OF OUR GRANDFATHERS.

RICHARD BARHAM ("Ingoldsby") died from cancer of the throat. Judging from the symptoms which he himself described it involved the larynx and pharynx. On May 29, 1845, barely two months before he died, he penned a most pathetic and graphic account of his illness and its treatment. This was sent to his old friend Mr. Hughes, the inspirer of his "Ingoldsby Legends," and published in Bentley's "Miscellany," June, 1862. It is a striking picture of the painful disease recorded by the sufferer, almost complete in its clinical details. In it we read of the vocal signs, of his heroic toleration of the periodic "touches with lunar caustic," and of his quiet protest against "*pil. hyd. c. cret.*" What must the dear old man have suffered! He dates his trouble in 1844 from "unguardedly swallowing the core of a pear," which got into his "windpipe."

His son tells us that he was attended by Drs. Roberts and Scott, with "the Eminent Surgeon Mr. Coulson."

"The Bulletin" here quoted was written on May 29, 1845. He died on June 17 of that year.

" 'Why I can't produce a note!  
I can't sound one word, I think, whole,  
But they hobble,  
And they gobble,  
Just like soap-suds down a sink-hole,  
Or I whisper like the breeze  
Softly sighing through the trees.' "

" 'Well, Sir—never mind, Sir,  
We'll put all to rights you'll find, Sir,  
Make no speeches,  
Get some leeches;  
You'll find twenty  
Will be plenty,  
Clap them on, and let them lie  
On the *pomum Adami*;  
Let them well your trachea drain,  
And your larynx,  
And your pharynx—  
Please put out your tongue again!

" 'Now the Blister!  
Ay, the blister!

" 'When it rises,  
Snip it, Sir; and then your throat on  
Rub a little oil of croton:  
Never mind a little pain!  
Now, Sir, I must down your maw stick  
This small sponge of lunar caustic,  
Never mind, Sir,  
You'll not find, Sir,  
I, the sponge shall leave behind, Sir,  
Or my probang make you sick, Sir,  
I shall draw it back so quick, Sir;—  
This I call my prime Elixir!  
Now, Sir! Choking?  
Pooh! you're joking—  
Bless me! this is quite provoking!  
Stay, Sir!—gently!—take it easy!  
What can make you, Sir, so wheezy?  
There, Sir! that will do to-day.' "

WYATT WINGRAVE.

<sup>1</sup> | Life and Letters | of the | Rev. Richard Harris Barham | By His Son |  
Lon. 1870.

THE  
JOURNAL OF LARYNGOLOGY,  
RHINOLOGY AND OTOTOLOGY.

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### INFLUENZA.

ALTHOUGH much of the newspaper clamour during the present influenza epidemic is to be strongly deprecated, nevertheless we may, on the whole, welcome it as an indication of the lively interest taken nowadays in matters of public health. And, indeed, it is not difficult to discern in these excursions and alarms of the press the forging of an implement whereby the long-delayed Ministry of Health may at length be erected.

With the wider questions raised by the epidemic we, as specialists, may have little to do, but it is impossible not to ask ourselves what element it is in their nature or in their human soil that confers upon certain contagious diseases the occasional propensity to travel far and wide—a propensity often suddenly manifested, and acquired it would seem in one particular locality. The present wave radiates from Spain; the epidemic of 1889-90 came from Russia.

The notion that influenza spreads on the winds is as old as the human race, but it is a fact that even influenza, the fleetest of all epidemics, can invariably be traced to immediate human contact.

Thus the spread of the disease must obviously lie within our control, if only we knew how to exercise it. And if the first cases of an epidemic could be diagnosed and isolated much illness and loss of life would be prevented.

Unfortunately, it is impossible to recognise influenza the epidemic disease, as such, in the hour of its birth, and even to-day, with all their experience, bacteriologists are speaking in very uncertain tones regarding the morbid agent. Pfeiffer's bacillus may be—probably it is—the cause, but then Pfeiffer's bacillus is found when there is no epidemic, in sporadic cases which remain sporadic. What it is exactly that at one time gives to the bacillus its spreading quality and at another time withholds it is at the present moment unknown to us. And until it is known efforts at isolation must fail, since we are unable to determine when a sporadic case or group of cases is likely to originate a wide-spread and serious epidemic.

For individual protection during the epidemic the use of the surgeon's face-mask or veil both by the patient and by his attendants obviously suggests itself as a protection against the spraying of the



neighbourhood with droplets of infected saliva, and in the second place dishes and other utensils soiled by the patient should be sterilised regularly and all discharges burned. But we do not recommend "sniffing" salt water up the nose as an influential medical corporation has recently done.

Each epidemic wave of disease has certain characters that distinguish it from other epidemics of the same disease. Many observers must be able to recall influenza epidemics in which cases of serious osseous destruction in and about the middle ear were very prevalent. At the present time this grave complication seems to be less common, but we are meeting, on the other hand, with a large number of cases of pharyngeal inflammation, amounting often to cellulitis of the peritonsillar and retropharyngeal regions, sometimes simulating diphtheria, sometimes resembling the more severe scarlatinal throat. Abscess-formation is not uncommon, and there is always great swelling around and enlargement of the cervical glands, with such constitutional phenomena as high fever and delirium. This type of the disease is tedious and depressing to the general health and resistance, but it tends to recovery in most of the cases in about ten days from the onset. D. M.

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## THE CLASSIFICATION OF THE SYNDROMES OF ASSOCIATED LARYNGEAL PARALYSES.

BY DR. MAURICE VERNET (Marseilles).

FOR their long passage from their terminal ramifications in the muscles of the larynx to their starting-point on the level of the bulbo-nucleus, the nervous motor-fibres of the vocal cords are liable to a great variety of injuries. This is what explains the constantly increasing number of forms which have been described of simple recurrent paralyses and of laryngeal associated paralyses.

The simple recurrent paralyses, that is to say manifesting themselves only by the paralysis of a vocal cord, are well known when they are caused by aortic aneurysm, by cancer of the œsophagus or by goitre, for example.

But as one follows upwards, towards the base of the cranium those recurrent fibres may be seen first going along in the pneumogastric cervical trunk, passing afterwards through the internal branch of the spinal nerve, and effecting, at that level, more and more intimate anatomic connection with the four last cervical nerves—the glosso-pharyngeal, the pneumogastric, the spinal accessory (external branch), and the hypoglossal nerves. These relations of proximity are continued alike in the cranial cavity and even to their starting-point in the bulb, where they are in immediate contact. So, by ascending the recurrent fibres it may be noticed that anatomically every cause of compression or physiological change of these fibres can influence simultaneously to a more or less extent the participation of one or several neighbouring nervous trunks. Simple laryngeal hemiplegia becomes an associated laryngeal hemiplegia. From the great variety of associated lesions a great variety of syndromes result.

There is no one who has not met with real difficulties in the study of such a question, whether in what concerns the *classification* of the syndromes or what refers to their *representation*.

This is due to several causes: On one hand, until now, the limited extent of our knowledge of the precise distribution of some of these cranial nerves or of the signification of disturbances recognised at the present time to be in dependence on them; on the other hand, a lack of method.

Our new observations were made notwithstanding the multiplicity of the forms already described; they did not always find room in the existing frameworks. The authors of these observations then proposed a new variety of syndromes. Messrs. Rose and Lemaitre (1) wrote in 1907: "One could create as many syndromes as there may be of paralytic combinations."

The real difficulty is, perhaps, not in the variety of combinations or syndromes, but, we believe, more in their signification or their representation.

Let us retrace the chief stages which enable us to view the question as a whole. We may recall the following forms:

In 1864 Hughlings Jackson (2) was the first to call attention to the homolateral paralytic association of the larynx, of the soft palate, of the tongue, and of the muscles of the neck (sterno-cleido-mastoid and trapezius).

In 1891 Avellis (3) describes the *palato-laryngeal* hemiplegia.

In 1892 Schmidt (4) the paralysis of the soft palate, of the larynx, and of the neck muscles (sterno-mastoid and trapezius).

In 1906 Tapia (5) brings, in his turn, the description of the syndrome characterised by the paralysis of the tongue on one side and of the larynx on the same side.

In 1915 Collet (6) describes the total hemiplegia syndrome of the last four cranial nerves (7) to (13).

In 1915 (14) I isolated, for the first time, the hemiplegia of the soft palate, larynx and pharynx—the characteristic syndrome of the three nerves of the foramen lacerum posterius (15) to (19).

By the side of those syndromes, of which we shall see the importance in the classification which will follow, we find a certain number of observations collected by Broeckaert (20) in 1907 of the paralyzes of the recurrent nerve associated with the paralysis of the great sympathetic nerve on the same side.

In 1910 Garel and Gignoux (21) call attention to the paralyzes of the recurrent nerve associated with paralysis of the sterno-mastoid and the trapezius, without any paralysis of the soft palate.

Other observations show the association of the recurrent paralysis with paralysis of the branchial plexus on the same side (Collet and ourselves).

Finally, some authors—Poli (22) in particular—quote a certain number of cases gathered under the name of "atypic" forms and of "crucial" forms.

It is obvious that such a variety of paralytic combinations may appear as inordinately extended ground. Of all the attempts at classification made until now, none of them seem to have brought the necessary foundations for a strict systematisation.

Rose and Lemaitre (*loc. cit.*) propose to substitute instead of the terminology by proper names, evidently without a precise signification, a designation of the syndromes by the organs injured. From this point

of view the matter gains evidently in clearness. Jackson's syndrome becomes glosso-palato-laryngeal hemiplegia or glosso-palato-scapulo-laryngeal, according to the incompleteness or completeness of the syndrome—that is to say, without or with paralysis of the muscles of the neck. One could name similarly Schmidt's syndrome, the scapulo-palato-laryngeal hemiplegia.

This designation by each organ could be represented in its essential forms by the following schema :

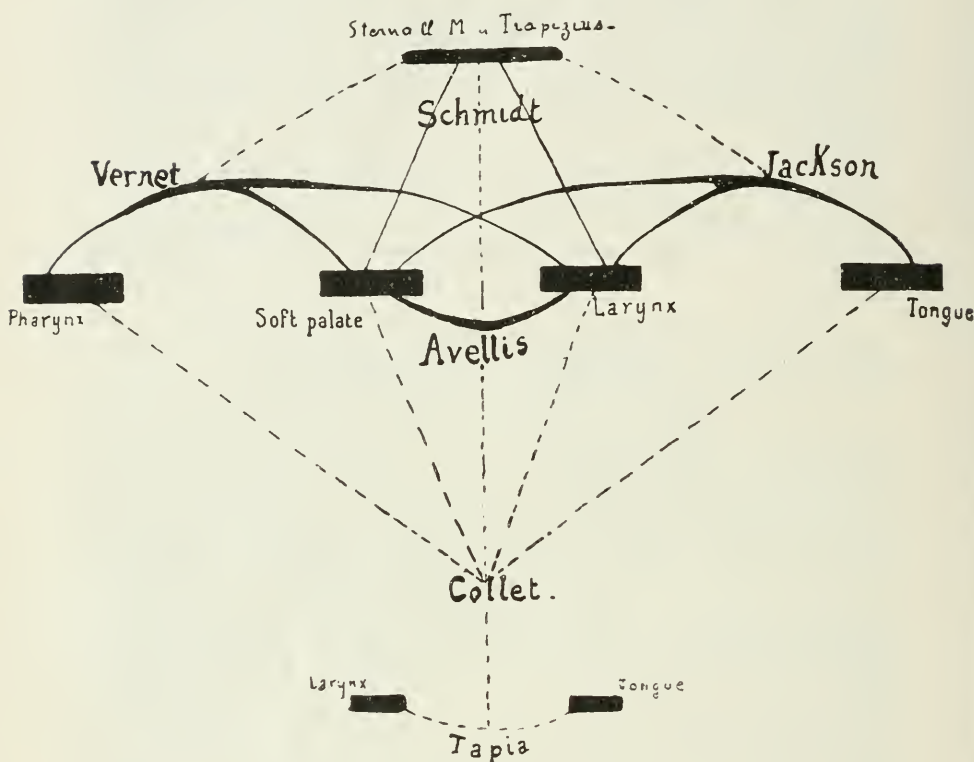


FIG. I

Schema representing by organs the paralytic syndromes observed, depending upon the last four cranial nerves.

But several objections can be raised to this designation. On one hand, certain forms (as the glosso-scapulo-palato-laryngeal hemiplegia) are long appellations, and upon the whole not easily understood as regards the representation of the lesions. On the other hand, this designation, that would be satisfactory if each of the injured organs were to have a single innervation, becomes defective and insufficient for organs whose innervation is, at least, double or triple, as, for instance, the tongue, the pharynx, and the soft palate.

Just as in the case of the limbs, we are obliged to take into consideration the phenomena of sensitive (sensory) paralysis as well as

those of motor paralysis, and, I may add, those of special sense paralysis as well as those of sensory paralysis.

This is the case in the tongue, of which the motor innervation arises from the hypoglossal, the sensory innervation from the trigeminal, and the pneumogastric, and the sensorial (special sense) innervation from the glosso-pharyngeal nerves. It is important to determine what is due to each of them to allow an estimation of the gravity, and, at times, of the nature of the causal lesion.

In limiting ourselves only to the motor phenomena, the appellation by organs does not limit by any means the varieties of paralytic combinations, as is shown in the following attempt at classification by Sanz (23), who has been able to isolate at least ten possible forms; and we must notice that the pharynx is not included in these varieties.

The author represents each organ by an initial:

Soft-palate, p.: vocal cord, v.; sterno-mastoid and trapezius, m.; tongue, t.

Here are these various combinations:

P.v.m., p.m., v.m., p.v.t., p.t., v.t., m.t., p.v.m.t., p.m.t, v.m.t.

In 1906 Poli (*loc. cit.*), in a highly documented brochure, proposed a different classification, and distinguished the forms of syndromes into "simple forms," "associated forms," and "symptomatic forms."

This classification divides still more the variety of the syndromes instead of creating determined and exact forms. Besides the difficulty of fixing with certitude that such a case results from such a form (a simple form or a symptomatic form, for instance), it is to be observed that the associated forms are very often symptomatic or *vice versa*. We have previously alluded to the importance of the sensitivo-sensorial disorders in the study of these syndromes.

If we consider that till now, and in the author's mind, the distinction of the peripheral and central forms were made upon the modifications or upon the integrity of the sensibility (or, again, upon the reaction of degeneration), we cannot but reject such a point of view, seeing that the central as well as the peripheral forms may present the same disorders of sensibility.

M. Sicard, devoting an interesting dissertation to this question, rightly considers that "the only classification which has any practical importance is that which would, at first, obey the topographic lesional diagnosis and afterwards the ætiologic diagnosis."

This is, in reality, the aim that each classification must essentially seek to attain. But a topographic and ætiologic diagnosis is only possible or easy as far as the syndromes appear themselves simple in their anatomic and clinical representation, and limited in determined and precise types. We must therefore seek a classification—clear, that is to say, pointing out the paralytic associations in such a way that all the lesions that a given syndrome admits may be evoked, all at once, in the mind—avoiding the use of proper names without any exact signification, creating limited types, but sufficient to contain easy combination of association. *Only an anatomo-physiologic classification can fulfil these conditions.* Therefore we have proposed to *designate precisely each paralysis or paralytic syndrome by each or all of the nervous trunks concerned in each of them*, as we do with regard to other nervous trunks or plexuses of the organism. This is a question not only of simplification, but of method.

If it is difficult, for instance, to a mind unfamiliar with such



paralytic combinations to evoke rapidly under the name of Schmidt's syndrome what this appellation represents, it is obviously easier to do so with the simple designation of spinal paralysis. It is the same thing evidently concerning more complex combinations between each of the four nervous cranial trunks proceeding from the basis of the

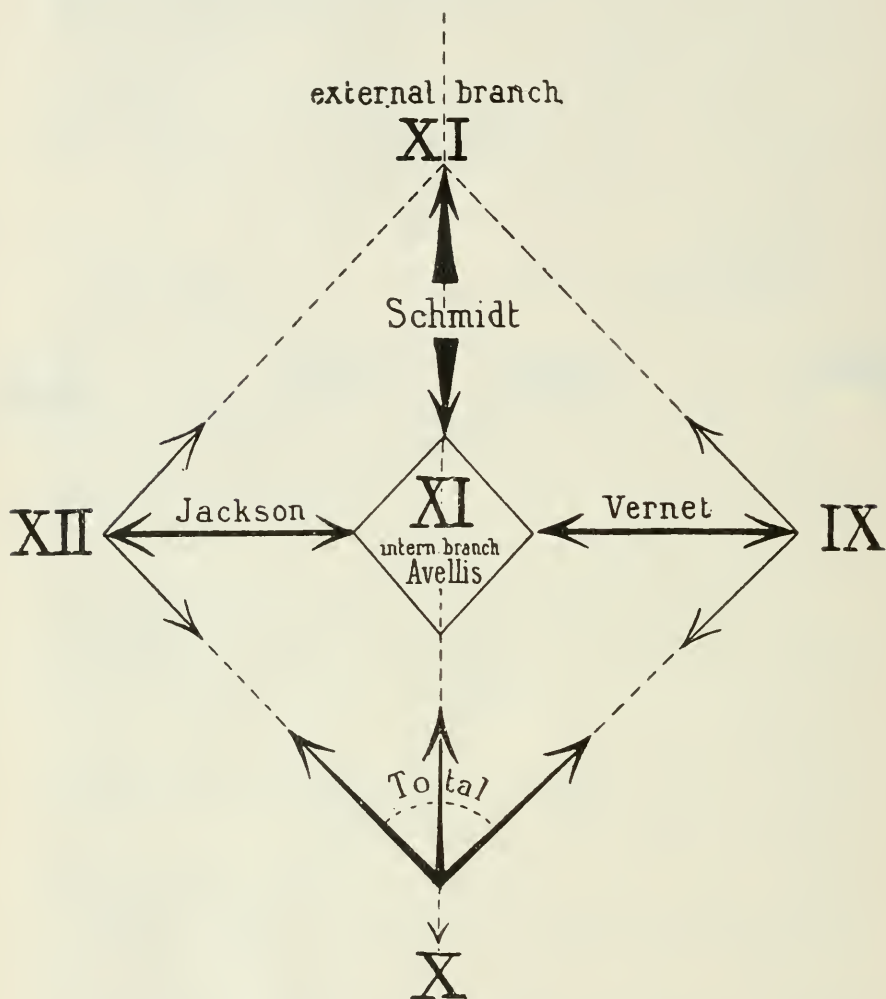


FIG. II

cranium—the ninth (glosso-pharyngeal), the tenth (pneumogastric), the eleventh (spinal), and the twelfth (hypoglossal) nerves. Who does not picture to himself clearly under the name of "spinal and hypoglossal paralysis" the syndrome illustrated till now by the name of Jackson?

Such a designation of the syndromes of laryngeal associated paralyses, based on the lesion of the nervous trunks properly called,

besides its advantage of obvious clearness, offers that of a more exact and more complete representation of all the symptoms—more exactly in so far that it informs us, at once, on the probable seat and the extent of the lesions concerned (in the sense indicated by M. Sicard), more completely because it does not exclude from the clinical list certain sensitivo-sensorial troubles, pulmonic or cardiac, for instance, which the simple designation of the chief organs injured would omit. This designation finally creates exact types, pointing out with great clearness the number of possible combinations, limiting them to the essential forms.

If, in fact, the paralyzes of the terminal branches of these nervous trunks may be multiple and varied, they constitute only modalities, more or less rough, sketched from the preceding ones; their clinical appearance is very peculiar; their interpretation, not causing, as a rule, any difficulty, is of less interest.

*The truncal paralyzes alone constitute syndromes having a real clinical individuality and a diagnostic interest of first rank.*

We have tried to represent in a schema the various combinations of associated laryngeal paralyzes, taking into consideration each of the four nervous trunks in its paralytic association with the internal branch of the eleventh, which is the nerve of the larynx, and in retaining only the forms where one at least of these nervous trunks is concerned.

At each of the corners of the square represented, one of the four cervical nerves—ninth, tenth, eleventh, twelfth—is found. Some of the associations thus constituted are, as we can see, completely limited from this point of view.

We have purposely indicated, for comparison, beside each association, the name that has been given until now to the corresponding syndrome. The arrangement of the arrows in heavy type shows their essential composition.

In adopting this nomenclature by nervous trunks we could indicate the syndromes of associated laryngeal paralyzes in the following manner:

Avellis . . .	= Spinal nerve —	Incomplete —	(Internal branch).
Schmidt . . .	= Spinal nerve —	Complete —	(Internal and external branch).
Jackson . . .	= Spinal nerve —	{ Complete or incomplete	+ Hypoglossal nerve.
Vernet . . .	= Spinal nerve —	{ Complete or incomplete	+ Glosso-pharyngeal nerve.
Collet . . .	= Spinal nerve —	{ Complete or incomplete	+ Hypoglossal nerve. + Glosso-pharyngeal nerve.

*Each of them with or without the pneumogastric nerve.*

It should be noticed that we are representing the pneumogastric nerve as an accessory in this nomenclature. We consider the tenth properly called as being or not being susceptible of inclusion in each of these forms. We have tried to show, by basing our argument upon clinical notions and upon the present general opinion of physiologists, that this nerve must be considered as solely sensitive,<sup>1</sup> consequently as

<sup>1</sup> Vernet, "Associated Laryngeal Paralysis," 1916, pp 56 and 75, and *Rev. Neurol.*, 1918.

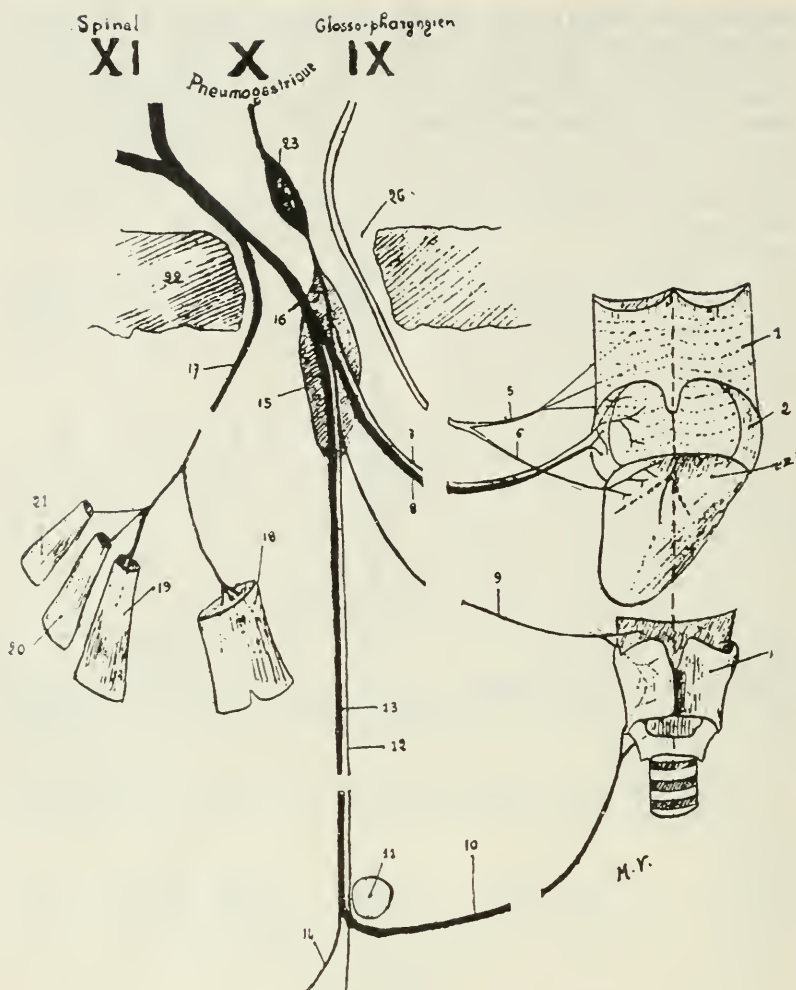


FIG. 3.—Schematic distribution of the three cranial nerves issued from the foramen lacerum posterius. By the author. 1. Superior constrictor muscle of the pharynx. 2. Soft palate. 3. Tongue. 4. Larynx. 5. Motor fibres of the IXth for the superior constrictor of the pharynx. 6. Gustatory fibres from the IXth for the posterior third of the tongue. 7. Sensitive fibres issued from the Xth for the soft palate and the mucous membrane of the buccal part of the pharynx. 8. Motor fibres issued from the XIth for the soft palate. 9. Superior laryngeal nerve (sensitive fibres issued from the Xth, sometimes a few motor fibres issued from the XIth for the m. crico-thyroid. 10. Recurrent (motor fibres issued from the internal branch of the XIth). 11. Subclavius muscle. 12. Pneumogastric. 13. Motor fibres (laryngeal and cardio-moderator) issued from the XIth going along the neck in the trunk of the Xth. 14. Cardio-moderator fibres. 15. Plexiform ganglion. 16. Internal branch of the XIth. 17. External branch of the XIth. 18. Sternocleidomastoid. 19. Clavicular fasciculus of the trapezius. 20. Oberomental fasciculus of the trapezius. 21. Spinal fasciculus of the trapezius. 22. Basis of the cranium. 23. Jugular ganglion. 24. Foramen lacerum posterius.

intervening in the modalities of associated laryngeal paralyses only to complete the clinical list without modifying anything of their essential paralytic form.

All the same a very considerable interest exists in noticing carefully the degree and value of its physiological change when it exists by the side of that of other nerves. So much the more, the disorders in its dependence may singularly enlighten a diagnosis of the seat and of the extent of the lesions, whose importance we have already mentioned. It

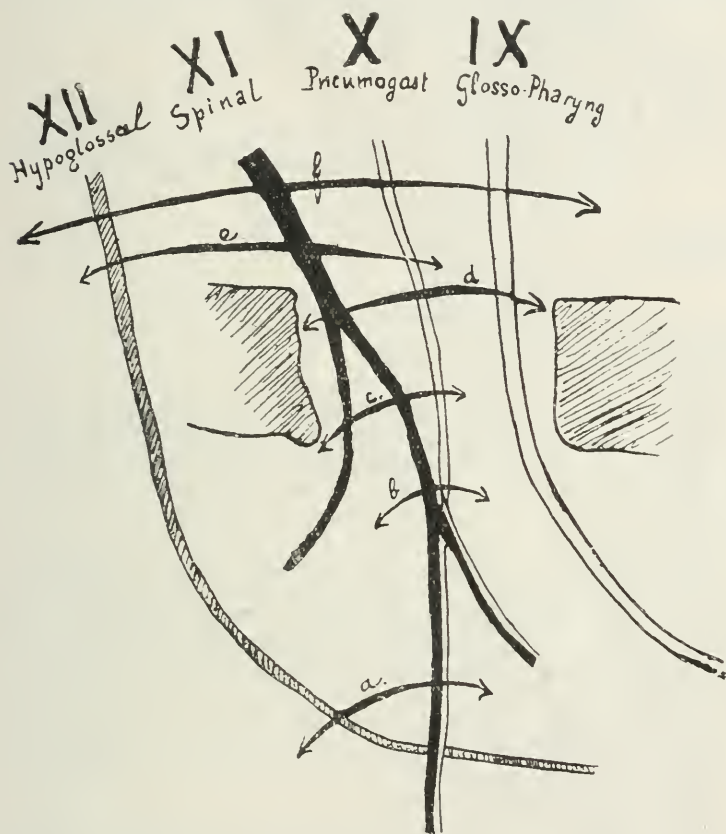


FIG. 4.—Schema representing by nerves the syndromes of associated laryngeal paralysis. *a*, Tapia. *b*, Avellis. *c*, Schmidt. *d*, Vernet. *e*, Jackson. *f*, Collet-Sicard.

is for that reason that we have represented in our schema the tenth as being of the same importance as the eleventh, the twelfth and the ninth.

Each of the schematised associations has been united to it by a dotted line and a common arrow. It is the same thing for the external branch of the spinal nerve, which, by its anatomical disposition, may or may not be concerned.

This schema may be made more explicit by representing the distribution of the nerves themselves, which it is necessary to have



present in the mind. In the two designs (Figs. 3 and 4) we find on one hand the schematic distribution of the nerves, on the other, the associated lesions traced out on the nerves themselves.

Finally, we recapitulate, in a general list, the principal symptoms depending on each nerve :

- |                           |   |   |
|---------------------------|---|---|
| Paralysis of<br>the IXth  | { | <i>Paralysis of the superior constrictor of the pharynx</i> (curtain movement <sup>1</sup><br>of the posterior wall, disturbances of the deglutition of solids).<br><i>Disorders of the taste</i> —posterior one-third of the tongue.   |
| Paralysis of<br>the Xth   | { | <i>Disorders of the sensibility of the half—</i><br><i>of the soft palate</i> (25),<br><i>of the pharynx,</i><br><i>of the larynx,</i><br><i>of the auricular branch,</i><br><i>Disorders of salivation.</i><br><i>Coughing crises.</i><br><i>Respiratory disorders</i> (intermittent dyspnoea and pseudo-asthma) (25). |
| Paralysis of<br>the XIth  | { | <i>Internal branch :</i><br><i>Paralysis hemi-soft palate</i> (26),<br><i>hemilarynx.</i><br><i>Acceleration of the pulse.</i><br><i>External branch (27) :</i><br><i>Paralysis of the sterno-clavicular mastoid.</i><br><i>Paralysis of the trapezius.</i>   |
| Paralysis of<br>the XIIth | { | <i>Hemiplegia of the tongue.</i>  |

The question thus limited, all the interest then resides obviously in the diagnosis of lesional topography and the etiologic diagnosis. It clearly appears that our classification facilitates in a great measure such precisions. *The designation by nerves keeps in fact all its value whatever may be the seat (radicular peripheric, bulbar, or bulbo-medullar) of the lesion.*

All the above syndromes<sup>2</sup> may be realised by a bulbar lesion, as they are at the periphery. But we must acknowledge that in general they are then, themselves, associated with another disease, of the axis cerebro-spinal, hemiplegia, hemianæsthesia, tabes, sclerosis in patches, syringomyelia, etc., in the frame of which they are merely an epiphenomenon—a symptom.

From this point of view each *simple* syndrome, formed at the expense of the last cranial nerves, ought to be considered as peripheric, every other syndrome as central.

We wrote<sup>3</sup> as early as 1916—

“The bulbar forms of associated laryngeal paralysis rarely exist in a simple state. . . . One must doubt, in general, of the bulbar

<sup>1</sup> By *curtain movement* is meant a movement of removal of the pharyngeal wall of the mucosa, similar to the movement made by a curtain which one draws. This movement is the characteristic sign of the paralysis of the glosso-pharyngeal nerve.

<sup>2</sup> We have been able to observe a total syndrome of the four last cranial nerves of a bulbar origin exactly similar to an analogous syndrome of peripheric origin from the point of view motor and sensitivo-sensorial. But a clear and persistent hemiparesis of the limbs and the mode of beginning allowed us to determine clearly the lesional topographic seat. We have at the present time a series of other cases (about fifteen, published or still unpublished) upon the syndromes of the last four nerves of exo- or endo-cranial origin, or upon the simple syndromes of the foramen lacerum posterius, or Jackson's syndromes.

<sup>3</sup> *Loc. cit.*, pp. 107 and 108.

origin of an associated syndrome which evolves singly for a long length of time, and think rather of a peripheric cause in the forms of a slow commencement."

M. Sicard concludes still more formally to decide a diagnosis of exo- or endo-cranial localisation: "The simple form of the syndrome always denotes an exo-cranial origin."

That is incontestable for the simple forms of associated and complex laryngeal paralyses, that of the four last cranial nerves or that of the three nerves of the foramen lacerum posterius, for instance. We can admit, as a rule, that it is the same thing for the simple paralysis of the pneumogastric, of the total spinal and hypoglossal nerves (formerly Jackson).

Harmer wrote, in 1902: "I have not found any case in medical literature of the unilateral paralysis of the tongue, of the soft palate, of the larynx, and of the muscles of the neck in which a bulbar seat of the affection may be demonstrated."

We think that it is exactly the same for a certain number of observations published till now under the name of Avellis's syndromes or Schmidt's syndromes where it has been found impossible to produce a diagnosis of localisation.

In a great number of these observations some perturbations of deglutition, evident enough, were related, without paralysis of the glosso-pharyngeal, which was till then misunderstood, being suggested as cause. The diagnosis of this paralysis would have made it possible to ascertain the paralytic association of the three nerves of the foramen lacerum posterius and to localise definitely the causal lesion at that spot, as we have already shown. The paralysis of the glosso-pharyngeal, of the pneumogastric, and of the spinal nerves is, in fact, always peripheric in the simple state.

We can see in the first work that I wrote on this subject ("The Syndrome of the Foramen Lacerum Posterius," Vernet, "The Associate Laryngeal Paralyses," pp. 152 to 170) some very remarkable observations on this point of view, and in particular an observation of Rose and Lemaitre, where a diagnosis of bulbar localisation was stated as a simple syndrome of the foramen lacerum posterius, an observation by Tillev (28), one by Desvernines (29), etc. The observation that I published in the *Paris médical*, January 27, 1917, is of the same order.

Does that allow us to infer an absolute rule, that is to say, that each simple syndrome is peripheric? One cannot be so affirmative. There exist, incontestably, apart from the preceding cases, examples where the diagnosis of topographical lesion, and, with still greater reason, the etiologic diagnosis, cannot be precisely indicated, notwithstanding a thorough examination. Out of more than fifty cases which I have been able to gather of syndromes described till now under the name of Avellis's syndromes (paralysis of the internal branch of the eleventh), three times out of five only an etiologic diagnosis could be stated, besides frequently vague.

Certainly some of these cases are wanting in clinical information, but, for the most part, the general clinical examination was circumstantial enough.

What elements would permit in these cases a lesional localisation?

We have said that the perturbances of the sensibility in the pneumogastric and glosso-pharyngeal region, contrarily to what was formerly asserted, could be cited as well in the paralyses of bulbar origin as in

those of radicular<sup>1</sup> or peripheric origin. The reaction of degeneration cannot be taken as characteristic of a paralysis of peripheric origin.

M. Sicard has shown that the examination of the cephalo-rachidian liquid could not by itself give useful information as to the exo- or endo-cranial localisation. "The clinical signs," he says, "appear more important with regard to the diagnosis than the rachidian humoral reactions."

It is, in fact, much more from the manner of beginning, the manner of the evolution of the symptoms, from the examination of the sensibility or of the peripheric motricity, from the verifying of ocular or pupillary signs, or in the examination of reflex movements, etc. . . . that one could usefully settle the clinical examination of apparently simple syndromes of which a diagnosis of lesional topography would be uncertain.

The resolution of the clinical problem is only possible inasmuch as a given syndrome is clearly defined by exact anatomical and physiological representation.

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<sup>1</sup> Messrs. Sicard and Rimbaud have related to the Medico-chirurgical Society of the XVth Region, in the meeting of May 24, 1917, a new and interesting case from this point of view (*a case of condyloid lacerum posterius foramina syndrome of an endo-cranial origin*). Moreover, one may find with regard to the same case a diagnosis of topographical lesion which confirms the preceding views. See this number of *Marseille Médical*, p. 587, and *Paris Médical*, September 8, 1917.

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## A NOTE ON SCHULTZE'S MONOCHORD.

By W. M. MOLLISON.

THE determination of the upper limit of the range of hearing gives interesting, if not valuable, results.

Recently the Otological Section of the Royal Society of Medicine approved a "standard" scheme for the testing of the hearing; in that scheme the determination of the range of hearing was included, and it was suggested that Galton's whistle or the monochord should be used to investigate the upper limit of the range.

It is the endeavour of these notes to establish the claims of the monochord over the Edelmann-Galton whistle, as an instrument of greater precision, and therefore more worthy to be used where a standard is aimed at.

The monochord consists essentially of a steel wire stretched between projections at either end of a steel bar; on the bar is a "bridge" which grips the wire and thus can vary the effective length of wire; for convenience the bar is provided with a handle.

In practice the wire is 50 cm. long, and the bar is marked off in centimetres; this length of wire does not give low enough notes for all cases; to meet this a longer frame can be made.

The wire is a steel wire (a "banjo" wire), gauge 26.

The notes are produced by rubbing the wire in its length with a piece of wool soaked in methylated spirit or turpentine; the wool is held between the finger and thumb, and the wire pinched while the wool is pulled along the wire.

An alternative method is to use a piece of chamois leather coated with powdered resin, but this is not quite so easy to use.

With a little practice the most effective method of rubbing will be discovered: for the highest notes a short, hard rub is best, for lower notes a lighter rub, and one on that part of the wire nearer the bridge gives a clearer and cleaner note. It is easier to produce clear notes with a heavy frame.

In the production of high notes there is always the difficulty of overtones, and even when the note sounds simple to the normal ear there well may be overtones that are imperceptible.

The advantages of this instrument seem to be:

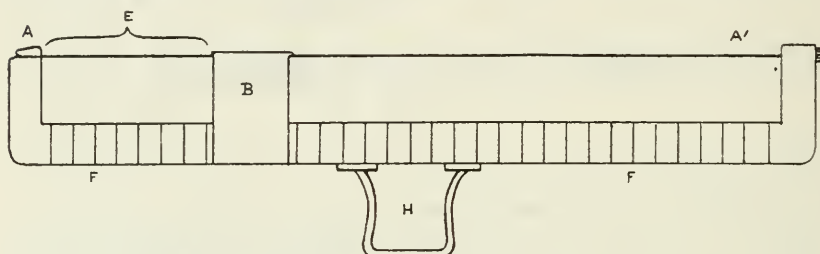
(1) It is easily standardised: the gauge of the wire can be fixed, and a steel piano-wire of known composition, chosen; granted this all



instruments will produce the same note for a given length of wire, since the tension of the wire is immaterial.

Compare this with the Edelmann-Galton whistle, where the construction alone is very complicated and open to many variations; where, too, the note produced by a given length of the pipe varies with the distance from the air-outlet and the force of the air-blast. So many factors are involved that each instrument requires testing by the sensitive flame; a special table is then drawn up, which must be consulted to read the results obtained.

As against this, with a fixed gauge steel wire every monochord will produce the same note for a particular length of wire thrown into vibration (at the same temperature).



A A'. The steel wire (gauge 26); fixed at either end of  
F F, the frame, marked in cm.  
B, bridge—sliding along F.  
E, effective length of wire.  
H, handle.

(2) The monochord is simple to use, the bridge can be moved along the bar very easily, and by "bracketing" the upper tone limit can quickly be found and read off in centimetres. The absolute upper tone limit in vibrations per second is quite unnecessary from a practical clinical point of view; it can be worked out mathematically, or be discovered experimentally by the sensitive flame.

(3) By placing the support of the wire on the mastoid process the upper tone limit through bone can be tested; this cannot be done with Galton's whistle. Some most interesting results can be observed by this method, and, indeed, they may change some of the previously accepted groupings of cases of deafness.

Normally the hearing for high notes is represented by 12-14 cm. of wire through air, and 10-12 cm. through the bone—that is, the air-bone relation (Rinne) is always negative for high notes. To this there appears to be no exception either in normal or deaf individuals.

## CLINICAL NOTE.

### CHOLESTEATOMA OF THE LATERAL PHARYNX.

By JOHN J. KYLE, M.D., F.A.C.S.,

Los Angeles, Calif.

A CYSTIC cholesteatoma of the tonsil in a rare disease. I have had a communication from the Librarian of the Surgeon-General's Office (U.S. Army) saying that there have been only two cases reported—one

by Major Norval H. Pierce, of Chicago, and the other by Wyatt Wingrave.

Cholesteatoma is a frequent complication of chronic middle-ear suppuration, and usually demands a radical mastoid operation. Cholesteatoma in the ear is a desquamative process of the epidermis lining the external auditory canal, occurring as a primary or secondary disease, and characterised by the formation of scale-like epithelial cells arranged in layers containing cholesterin. Sometimes the disease may occur secondary to a purulent inflammation of the external auditory canal or middle ear. The masses filling the canal are then cheesy-like, foul-smelling, and bathed in pus.

Cholesteatoma of the tonsils or lateral wall of the throat is a secondarily chronic purulent inflammation of the tonsil and adjacent structure.

In the secondary form the disease may also extend to the middle ear or to the mastoid cells by pressure, which destroys the osseous wall or membrana tympani, causing a disintegration of normal structures. In the secondary form it consists of broken-down epithelium cells and pus, with a serrated edge. The symptoms vary according to the stage of the disease and the consistency of the cholesteatoma cyst.

Located behind the tonsil the morphology differs from that in the chronic middle-ear suppuration. The cavity is round and serrated and has a flat floor. It does not bleed readily, no discolouring in the tissues, no odour. Slight pain is usually present, soreness of neck, and in my case has lasted many years. It is a slow-forming mass, and may go on for many years and only be accidentally found. It is very difficult to cure. We have curetted the case five times, and still there are symptoms of the cholesteatoma returning. After curettement it is best to treat with tincture of iodine.

This patient is a woman, and aged fifty-three.

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## SOCIETIES' PROCEEDINGS.

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### ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

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*Meeting on November 16, 1917.*

*President: H. J. BANKS-DAVIS, M.B., in the Chair.*

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**Gastro-intestinal Sepsis, a Cause of Menière's Symptoms.**—**T. Mark Hovell.**—Since Menière's paper was published on February 9, 1861, dealing with a set of symptoms produced by hæmorrhage into the labyrinth, and consequently producing an incurable form of deafness, this set of symptoms, with which his name has been associated, has conveyed to the medical profession at large the idea of a condition of the ear for the relief of which but little can be done.

Although aural surgeons of late years have clearly drawn the distinction between Menière's disease, or the class of cases to which Menière referred in his paper, occurring suddenly in patients without previous ear trouble, and Menière's symptom-complex occurring in patients suffering from an affection of the middle ear—which condition

for many years past I have preferred to call by the simpler term of Menière's symptoms—the distinction is not as yet universally understood in the profession, and there is in consequence a tendency, except with aurists, for any patient suffering with the group of symptoms which Menière described to be regarded as having an incurable ear disease, and, therefore, for it to be thought that all that can be done is to give palliative treatment, and hope that another attack may not soon occur.

It is my intention to confine myself now to the cases in which the symptoms occur in patients suffering from middle-ear disease, and come on without the reason being apparent, and not to deal with those in which the symptoms result from a procedure which obviously produces them, or a condition in which it is well known that they occur. Amongst the latter may be mentioned—syrringing the ear when perforation of the drum-head exists, quickly rotating the patient, an extension of suppuration to the labyrinth, such as is found in the course of acute disease from inflammation or infective processes extending to it, and the attacks of giddiness and tinnitus which occur sometimes as part of the vasomotor diseases which accompany the menopause.

Having noticed a similarity in the general condition of patients who become affected in this way, I began to pay close attention to the matter, and finding that the treatment adopted not only greatly diminished the frequency and severity of the attacks, but in some cases practically freed the patients from this distressing condition, I consider it only right to bring the matter forward so that a larger experience may be obtained.

Many of the patients whom I have seen had the following conditions present at the first visit: A furred tongue, congested pharynx, nasopharyngeal catarrh, hypertrophic rhinitis, flatulency, frequently causing a considerable amount of distension, and constipation, although sometimes the motions were broken and light-coloured. Several patients have told me that previous to an attack the motions have been noticed to be especially offensive. With these symptoms present it did not surprise me to find the blood-pressure often, although not invariably, high, for toxæmia due to intestinal sepsis is a common cause of increased blood-pressure, and, as might be expected, some dilatation of the heart often existed, although this symptom was not always present. I say, "as might be expected," for a common cause of cardiac dilatation is increased blood-pressure resulting from intestinal sepsis, and therefore some cardiac dilatation frequently exists, although often overlooked on account of its producing no audible symptoms or marked physical disability unless existing in a marked degree.

It is not customary to habitually examine the size of the heart by gently percussing the chest-wall whilst a stethoscope is held against it; if this were done the transition of sound from clear to more dull, indicating that the cardiac area had been reached, could easily be appreciated—as I have often heard it whilst my patient was being examined by the physician whom I had requested to ascertain the condition of this organ—and dilatation would be found to be far more often present than is now generally supposed.

Although I have only mentioned the toxæmia due to intestinal sepsis, oral sepsis due to pyorrhœa, decayed teeth, crowns or bridges must not be overlooked, or any other conditions which might tend to produce this result.

With the patient in the state which I have described it is not surprising that closure of the Eustachian tubes is usually present when Menière's symptoms exist, for, as I have many times pointed out, gastro-intestinal derangement is a common cause of congestion of the pharynx and nasopharyngeal catarrh, and consequent closure and catarrh of the Eustachian tubes. Nor is it to be wondered at that tinnitus and giddiness are found when toxæmia is present, these symptoms being more the result of this condition than caused by high blood-pressure when it exists.

With the condition present which I have described, it is obvious that in many instances it would add materially to the comfort of the patient if the set of symptoms known as Menière's symptoms were to convey in the first instance the impression of the existence of gastro-intestinal derangement, rather than as at the present time, an incurable condition of the ear; for with the former basis thoughts would travel to gastro-intestinal antiseptics, medicines for reducing blood-pressure and correcting digestive derangement, and to the advisability or otherwise as a preliminary measure of washing out the stomach with an alkaline solution in the usual manner by means of a funnel attached to a flexible rubber tube. In some cases I have had a specimen obtained from the stomach during fasting, and a vaccine prepared and administered as an adjunct to other treatment.

With regard to blood-pressure, I may mention in passing that a solution of adrenalin chloride taken internally is by many supposed to increase blood-pressure, but in reality a small dose reduces it, and three to five drops, with a little dilute hydrochloric acid and appropriately flavoured, makes a pleasant and useful mixture; but no medicine given with the object of reducing blood-pressure will obtain satisfactory results unless the intestinal tract is restored to a healthy condition, and as a first step to medicinal treatment I am in favour of a full dose of castor oil.

Although the removal of the cause is essential for the successful treatment of the case, local measures must not be neglected, as they also give material relief to the patient, and the most important of these is to restore the patency of the Eustachian tubes. In many instances the mere injection of air into the tympanum lessens the distressing symptoms, but I find that for permanently restoring the patency of the Eustachian tubes the injection into them through a catheter of a few drops of collosol argentum is often shortly followed by a beneficial result, and I know of no drug which more quickly produces this effect. Obviously the nozzle of the syringe which injects the drug into the catheter must not fit the catheter tightly, as in this case the drug might be forced directly into the Eustachian tube instead of being sent into it in the form of a spray by air pumped from an air bag, the nozzle of which closely fits the catheter.

To lessen the nasopharyngeal catarrh, collosol argentum or collosol iodine is useful, sprayed directly backwards through the nostrils by an all-glass or vulcanite spray producer, so that it reaches the nasopharynx and the orifices of the Eustachian tubes.

I take this opportunity to mention that the injection of a few drops of collosol argentum, or in some cases, of collosol iodine, into the Eustachian tubes with the object of restoring their patency not only applies to patients suffering with Menière's symptoms, but to closure of the tubes to Valsalva's inflation due to any cause. I have had many instances in which this treatment greatly relieved, and in many cases removed, tinnitus when closure of the tubes existed, although in many of them the patient was suffering from incurable deafness due to sclerosis or other conditions. Whether in this case the tinnitus is due to a congested condition



produced by long-continued closure of the tubes, and the mere restoration of the patency, by removing this, causes the tinnitus to subside, or whether it is due to the tissues being affected by the drug, I am unable to say. The result, however, is most satisfactory, for, as we all know, patients frequently say they do not mind the deafness, but it is the tinnitus which causes their life to be almost unbearable, so that this simple method of removing the trouble, often in old-standing cases, is worth remembering, as tinnitus has always been a difficult symptom to get rid of, and even the more troublesome treatment by ionic medication, when this gives relief, is not always followed by its complete removal.

I have found collosol argentum also useful for stopping earache, and usually apply it for this purpose by placing the patient with the meatus of the affected ear upwards and then filling it with the drug and allowing it to remain there.

Speaking of collosols, I may mention that I have been told that collosol iodine or collosol mercury should not be given in conjunction with arsenic, as iodism or mercurial poisoning respectively quickly follows this procedure. I have had no experience of the result of these drugs being administered together or in close succession, but think it well to call attention to this matter.

In conclusion I can only express the hope that the success which I found to attend the treatment of the class of Menière's symptoms which I have described may be of use to others, and thus tend to relieve and even permanently remove the distressing condition from which these patients suffer.

**THE PRESIDENT:** There is no doubt that in some cases with Menière's symptoms if the blood-pressure is reduced symptoms are arrested, and I think that fact is thoroughly well realised, as in some cases, if one prescribes nitro-glycerine or nitrite of amyl, the attacks cease. An important part of the treatment is to put the patient to bed and not let him move. Nothing reduces high blood-pressure quicker than rest.

**DR. ALBERT GRAY:** I agree with Mr. Hovell as to the importance of increased blood-pressure, but I should have been more interested to have heard about the cases in which the blood-pressure is below the normal, for that is a more common cause of Menière's symptoms than is high blood-pressure. I refer to disturbances in person in low health, and whose vasomotor system is, apparently, in a very unstable condition, patients who flush and become pale readily, and have attacks of giddiness. To such patients I have sometimes given suprarenal extract. They seemed to improve under it, but I have not attributed too much to the extract; the change is due rather to the improvement in general health. It is more easy to raise a low blood-pressure to normal than to bring down high blood-pressure, especially late in life, when patients are of the age when arteriosclerosis is apt to occur. These cases are more frequent during war time, especially when there have been sleepless nights and a wearing anxiety.

**LIEUT.-COL. P. GOLDSMITH:** There is one type of case which is associated with what is understood as small hard kidney. If you take cases of men and women over forty-five years of age who have tinnitus unassociated with middle-ear trouble and you examine the urine, you will find in a large number of the cases not necessarily albumen, but granular and hyaline casts. In those cases the blood-pressure is raised; at all events, it is so later on. In that type of case the lowering of the blood-pressure will improve the tinnitus; but, as time goes on, the tinnitus will recur unless care be exercised in regard to diet. In private practice

it was my invariable rule, in these cases, not only to take the blood-pressure reading, but also to do a microscopic urine analysis.

Prof. URBAN PRITCHARD: We must not forget the most common type of cases, the epileptiform cases of Menière's vertigo: in these there is no middle-ear trouble at all. Many are apt to rush to the conclusion that the symptoms are due to the middle ear. In a large number of epileptiform cases the symptoms wonderfully improve upon the patients taking bromides or hydrobromic acid, in large doses. There are a certain number of cases in which care in regard to feeding has to be exercised, but in the class of case to which I am specially referring it is a great mistake to reduce the patient's condition, because that will increase the tendency to recurrence. In some cases of Menière's disease one finds that these symptoms existed ten years ago, and afterwards disappeared, the return synchronising with a lowering of the general health. The dose of hydrobromic acid acquired by these patients is 40 minims, well diluted. I find 10- or 15-minim doses are of very little use.

Mr. HERBERT TILLEY: I agree with Dr. Gray that these cases are not always those with high blood-pressure. I am not referring to cases of classical Ménière's disease, but to those of the type we are frequently seeing at the present time, in which patients cannot follow their employment on account of mild attacks of giddiness, associated with tinnitus and some deafness. The worst case of this type I have seen was one in which I failed to relieve the patient with bromides or with small doses of quinine, but there was great, and I think permanent, relief from the administration of small doses of ergot—*i. e.* 30-minim doses of ernutol. Whenever an attack threatens, this patient takes a few doses, and it acts very well. These cases seem to be extraordinarily frequent just now. In pre-war days, if one saw four to six cases in twelve months in private practice one felt that it was about the normal proportion in aural practice. Now, however, I am seeing at least two or three cases every week, the slight vertigo and tinnitus being the chief symptoms. Whether it is due to the war, or to the raids, I do not know. There is a large increase of them in hospital practice also: I saw three in my clinic this morning. Prof. Pritchard has referred to the good effect of large doses of hydrobromic acid. I have found the combination recommended by Hughlings Jackson excellent—namely 5 gr. iodide of potassium, 10 or 12 gr. bromide of potash, in 2 dr. of the syrup of glycerophosphate. Whether the iodide lowers the blood-pressure I cannot say, but it is a sheet-anchor in the present type of mild case, which is nevertheless severe enough to make the patient feel unsafe in getting about. When the tinnitus is troublesome 15 minims of tincture of jaborandi is a useful addition to the above prescription. The associated deafness is the symptom of which it is most difficult to get rid, and in many cases it appears to be intractable to any form of treatment.

Dr. W. HILL: Lake, in his lecture at Boston, laid it down that in these cases in which there was vertigo, although the patients were deaf, there was no obvious ear condition. He said the best way was to separate the cases, leaving a residue with not much wrong with the ear. Those with high blood-pressure require calomel and bromides; those with low blood-pressure need ergotin. At St. Mary's the physicians send vertigo cases to me if the patients are deaf. Some are obviously cases of *petit mal* in deaf subjects, and should come under the care of the ordinary physician. I send my vertigo cases of this indeterminate class to the physicians, trying to persuade them that the cases are of a cardiac and gastric nature: but I have never succeeded for long, and I take it that

as they come back, the medical treatment must be disappointing. The worst case of tinnitus I have ever had was in a gentleman whose Eustachian tubes I bougied, because he had obstruction. One day he could not come to see me, and I went to see him. His doctor had a craze for washing out the stomach, and it was agreed it should be done, as the patient was a dyspeptic. It was done, and there was no return of the symptoms. I procured an apparatus and decided to wash out the stomach in these cases, but I have not known another case in which it has done any good.

Dr. KINGSTON BARTON: Speakers have been laying stress on the tinnitus in these cases, but in general practice my patients ask for treatment for the vertigo, as it is that which specially distresses them. The method thirty years ago was to give large doses of quinine, which made them very deaf, and then they got well. To-day, when vertigo is the most marked sign, the bowel is generally at fault, and there is very great benefit from calomel, sulphate of soda, or Gregory's powder.

Mr. SYDNEY SCOTT: I should like to emphasise certain features of Menière's symptom-complex which I have never heard dwelt upon in previous discussions. Like Dr. Hill I have sometimes repudiated cases labelled aural vertigo by the physicians, simply because, at the time of examination, between seizures, the hearing and vestibular reactions were normal. I have since learnt I was wrong, and I am not quite sure whether, as otologists, we all realise that in the great majority of cases of vertigo there is a defect of one or both Eustachian tubes at the time of seizure, the labyrinths being free from disease though disturbed by the abnormal conditions in the middle ear. And do all of us realise that some cases of vertigo are unaccompanied by deafness, and yet are due to unilateral Eustachian obstruction? We know, as a fact, that in Eustachian obstruction the hearing for certain tones is sometimes hyperacute. An example of this type was that of an airman, who had been flying in France for several months when he experienced dizziness and unilateral earache for an hour or two after having made a descent from 11,000 ft. in ten minutes. When he felt well enough to fly again, on rising to 9000 ft. he experienced distress in the right ear and started to descend; at about 4000 ft. he felt well again and reascended, to find the symptoms return. He abandoned his flight, and on landing felt the unilateral earache and dizziness he had noticed on a former occasion. He was seen by an Army aural specialist, who, finding the hearing good for voice and watch in both ears without inflating the ears, returned him to headquarters fit for duty. But the airman experienced the same symptoms during his next flight. On each occasion he was free from distress at about 4000 ft. When I saw him he was not deaf, but said the right ear felt abnormal. The tympanic membranes were intact, but the right membrane was displaced inwards, the handle of the malleus being foreshortened, and more oblique than usual on comparison with that of the other side. Moreover, the right membrane was hyperæmic.

#### HEARING TESTS.

R.	Tone Range.	L.
16 d.v. . . . .	(a) Low limit (Bezold fork) . . . . .	16 d.v.
(Sound painfully loud in the right ear in comparison with the left.)		
13.5 cm. . . . .	(b) High limit (steel monochord) length of wire emitting highest audible note . . . . .	12 cm.
—	Weber's test with Bezold A fork 118.75 d.v. per second . . . . .	Referred to the left.
2 ft. . . . .	Tone acuity for watch . . . . .	3.5 ft. (normal).
— 3 seconds . . . .	Tone acuity for fork (4096 d.v.) . . . .	normal.



During the patient's efforts to auto-inflate the ears the left membrane could be seen to move, but the right remained immobile. After catheterisation the right membrane was restored to its normal attitude, and the hearing-tests were perfectly symmetrical—that is, the hyperacuity for low forks disappeared, there was no lateralisation in response to Weber's test, the acuity for watch and fork, 4096 d.v., was equal, and the patient lost the discomfort he had previously noticed in the right ear. I think we shall agree that this officer was merely suffering from unilateral Eustachian obstruction, and that was sufficient to lead to vertigo without deafness. As otologists, it seems our place to emphasise the importance of this relationship, particularly, perhaps, at the present time. I should not like Mr. Hovell to imagine I am trying to belittle the importance of the toxic theory. I should be wrong if I did not admit the probable presence of toxins in the system in certain cases of vertigo. Possibly such toxins would render the nervous mechanism more susceptible to labyrinthine impressions. As to labyrinthine hæmorrhage being a common cause of Menière's symptom-complex I agree it is among the rarest. I have said elsewhere there are reasons for believing Menière's classical case to have been one of infective labyrinthitis, with serous meningitis following it,<sup>1</sup> and not a case of simple hæmorrhage.

Prof. URBAN PRITCHARD: In the case of a highly sensitive person in regard to the internal ear, the least obstruction in the Eustachian tube will produce the symptom, and in those cases there is practically no deafness.

Dr. DUNDAS GRANT: I was impressed, many years ago, in reading the accounts of a number of cases of Menière's disease recorded by Sir Stephen Mackenzie in which the ears had been examined by Mr. Mark Hovell, and he found that in most cases there was Eustachian obstruction. He touched the right chord at that time. Often there are two elements in these cases: There is the mechanical, produced by the tension in the middle ear, and the sensory, due to hyperæsthesia of the vestibular nerve or centres. The mechanical element depends upon this—that the annular ligament, the fenestra ovalis and the fenestra rotunda act as safety-valves for alternations of pressure in the internal ear. If these are tightened up, whether by sclerosis or the tension caused by the indrawing of the membrane by exhaustion of air, the safety-valve action is lost, and the slightest difference of pressure in the internal ear exerts its full effects on the hair-cells, so that vertiginous symptoms ensue. If the nerve is very sensitive this may occur with very little tension in the middle ear. If it is heightened from the presence of toxins, or neurasthenia, very slight Eustachian obstruction will produce it. The condition which is most likely to cause it is something analogous to arteriosclerosis, when there is insufficient compensation in the circulation. Then, if there is no safety-valve action in the fenestra, vertigo is inevitable. Probably much of the vertigo in many of our cases is due to an inequality in the action of the labyrinth on the two sides. I made some experiments, which will stand repetition, with regard to that point. I have long found that in aural vertigo, especially if it be due to the throwing out of gear of one labyrinth while the other remains uncompensated, a small dose of quinine, or salicylate of soda, has an extraordinary effect in quieting the vertigo. To discover the reason for this I tested the sound labyrinth by the hot-air test for inducing nystagmus. I found that when the quinine had been given, it required a much longer action of the hot air to produce nystagmus in the sound side. I concluded that the vertigo was, to a

<sup>1</sup> *Arch. of Otol.*, 1908.



considerable extent, due to the over-action of the healthy labyrinth. It may be taken as a general rule that when the vertigo is due to latent epilepsy, it is relieved by bromide of potassium; when due to arteriosclerosis, by iodide of potassium; when due to injury, I have seen it constantly relieved by perchloride of mercury. When it is due to irritability of the vestibular nerve, minute doses of quinine will produce a beneficial effect. I look upon the behaviour under quinine as being almost the touchstone as to whether the vertigo is of aural origin or due to epilepsy, because, as neurologists will tell you, it is an important distinction, and one which in certain cases it is extremely difficult to determine.

The PRESIDENT: There is a great difference between Menière's disease and Menière's symptoms as described by Mr. Hovell. Menière in his paper described the case of a girl who caught a chill at her menstrual period. She became deaf in both ears, accompanied by severe tinnitus, vertigo, and irremediable vomiting, from which she died. Nothing *post-mortem* in the brain and spinal cord was found to account for death, but when the temporal bones were examined the semicircular canals on each side were found to be filled with blood and fibrinous exudation. From this case and several others like it he described the picture of a distinct acute disease characterised by bilateral deafness, vomiting, tinnitus, and vertigo, due to labyrinthine hæmorrhage. This is Menière's disease, and the term is not applicable to symptoms of chronic affections of the middle or internal ear such as we so often see. A few months ago I saw a case which made an impression on me. The patient was an officer who was sent to me as a "case of Menière's disease." On several occasions when turning round suddenly at the head of his battery to give commands, he fell off his horse and was sick and giddy for two hours. I attributed the vertigo to his aural condition, for he was deaf as most gunners are. He rapidly developed marked symptoms of tabes, from which he died, and doubtless his symptoms from the commencement were central and not aural. This possibility should be borne in mind.

Mr. E. D. D. DAVIS: After reading Lake's paper, I took the blood-pressure of many cases of tinnitus, and found it varied from subnormal to supernormal. I could not establish any relationship between the blood-pressure and the tinnitus. I find the treatment of the tinnitus of otosclerosis very unsuccessful. Major Waggett and I have used collosol argentum for antral cases, but we both found even a 2 per cent. or a 4 per cent. solution caused pain and increased secretion of mucus, so I gave it up, and resumed boracic lotion, which is quite as good as collosol argentum, and of course cheaper. I ask whether anyone has had success in treating the tinnitus of otosclerosis.

Mr. MARK HOVELL (in reply): I have had cases in which the blood-pressure was high and others in which it was low, but neither Dr. Gray nor Mr. Tilley, who referred to this, said anything about the condition of the digestive tract. I think in their cases that probably the digestive system was out of order. In answer to Dr. Urban Pritchard, I am aware that he published a most interesting paper in conjunction with Mr. Lake, and reported some cases which were of an epileptiform type, and for those, doubtless, bromide is a remedy. In answer to Dr. Kelson, in most cases occurring in excessive tobacco smokers there are digestive disturbances—in fact, tobacco causes toxic symptoms. I am glad Mr. Scott found nasopharyngeal catarrh in the cases he referred to, for I have usually noticed that catarrh is secondary to gastro-intestinal irritation, and that local remedies in addition to general treatment succeed when local measures alone have failed.

## Abstracts.

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### EAR.

**Primary Diseases of the Labyrinth as the Result of Focal Infection.**—**G. E. Shambaugh.** "Annals of Otology, etc.," xxvi, p. 685.

Distinguishes three distinct types of primary degeneration in the labyrinth: (a) Cochlear, (b) vestibulo-cochlear, (c) vestibular. Upon these depend the wide variation of symptoms. The ætiology is quite clear in many cases—it may be syphilitic, or occur as a sequel of mumps, typhoid, measles, scarlatina, etc. But there remains a large percentage in which the cause is not accounted for and in these it is probably that focal infection is responsible. Four cases are given, due respectively to acute rheumatism, septic tonsils, arthritis, tonsillitis, and chronically infected tonsils.

The paper is evidently a continuation to that by the same author in a previous issue of the "Annals" (xxiv, p. 480). Similar cases were recorded by the reviewer in "The Practitioner," xxviii, p. 245.

*MacLeod Yearsley.*

**The Diagnosis of Vertigo.** (1) Vertigo as a Symptom of Primary Disease of the Labyrinth.—**George E. Shambaugh.** "Journ. Amer. Med. Assoc.," 1917, September 8. (2) Aural Vertigo Occurring in Suppurative Disease of the Middle Ear.—**P. D. Kerrisson.** *Ibid.* (3) Vertigo due to Intracranial Disease.—**T. H. Weisenburg.** *Ibid.* (4) Value of Bárány Tests in the Diagnosis of Vertigo from whatever Cause.—**Isaac H. Jones.** *Ibid.*

In this interesting group of papers the problem of vertigo is approached from various points of view.

The first two writers deal with the question as it presents itself to the aurist.

Shambaugh remarks that great advances have been made since Ménière, in 1851, showed that vertigo might be associated with disease of the internal ear. It soon became obvious that cases of Ménière's disease were not all due to hæmorrhage into the labyrinth, and the term "Ménière's syndrome" appeared more applicable. Under this heading are grouped cases characterised by attacks of vertigo, associated with tinnitus and deafness, cases which differ widely, however, as regards their pathology.

(1) Hæmorrhage into the labyrinth is probably of rare occurrence, though it may occur as a complication of blood diseases, such as leucæmia, purpura, and pernicious anæmia.

(2) Embolism of the labyrinthine artery may occur in caisson workers, the result of gas emboli, and the writer has seen one case of blood embolism during the puerperium.

(3) Syphilis, secondary or tertiary, and hereditary syphilis may invade the labyrinth, but, as a rule, the progress is so gradual that the disturbance of equilibrium is "compensated," and vertigo does not occur.

(4) Neuritis of the eighth nerve may be caused by quinine, alcohol,

or tobacco, or by the toxins of infectious fevers. Sometimes the vestibular nerve is alone affected, so that the vertigo is unaccompanied by tinnitus or deafness.

The most frequent cause of vertigo is "a chronic degenerative process affecting the peripheral neurons of the cochlear and vestibular nerves, characterised by high-pitched tinnitus and loss of hearing for high tones." Attacks of vertigo occur, and these are regarded as the result of labyrinthine hæmorrhage by some authorities, who would reserve for such cases the term "Ménière's disease." The loss of function in the semicircular canals may be demonstrated by the rotation of caloric tests. Many of those cases are the result of some chronic focal infection, such as is often to be found in the faucial tonsil.

Confining his attention to the vertigo which may occur in cases of otitis, Kerrisson alludes, in passing, to those rare occasions when the symptom does not imply involvement of the labyrinth in the suppurative process.

As a rule the vertigo of middle-ear suppuration is the result of an infection spreading to the labyrinth.

During the acute stage, which the aurist seldom sees, there is spontaneous nystagmus towards the side opposite the lesion, subjective sensation of the rotation of surrounding objects in the plane of the nystagmus, and a tendency of the patient to fall, if standing, in the direction opposite to that of the quick eye movement.

In an uncomplicated case of suppurative labyrinthitis those symptoms of vertigo, nystagmus, and ataxia gradually subside, leaving the patient in what is known as the latent stage. In some cases there may still be brief attacks of vertigo, induced by some movement or position to which the patient has not been re-educated, such as going up or down stairs, sudden turning, or standing at a height or on a narrow support. It is clear that such vertigo constitutes a menace to the patient's life.

During the acute stage there has been a recent infection of a bone cavity from which the anatomic pathways to the meninges are still open and unguarded, and it is clear that the treatment must consist in absolute rest and quiet and a postponement of all operative interference.

By the time the latent stage is reached the focus of infection has become walled off by inflammatory exudate, but is still liable to break down the barriers and infect the meninges. It is then that a careful radical mastoid operation, with drainage of the labyrinth, is the only treatment which will safeguard the patient's future.

Vertigo, in any suppurative lesion of the ear, is always a serious symptom, and the questions of whether to operate and when to operate will require the aurist's best judgment.

Patients do not die of suppurative labyrinthitis *per se*, but of a secondary intracranial infection, and before deciding upon operation, the chances of recovery without operation, the possible influence of an operation in causing a spread of infection, the stage at which operation is safest, must all receive due consideration.

Weisenburg treats the subject from the standpoint of the neurologist. He describes a number of cases of cerebral tumour in which vertigo was present. Vertigo in such cases points to a great increase of intracranial pressure, or to disease of the posterior cranial fossa.

A patient with a left cerebello-pontine angle tumour had no dizziness on standing upright or looking to the right, but whenever he looked to the left he at once felt dizzy.

In a patient, aged six, from whose right cerebellar hemisphere a cyst

was removed, vertigo was entirely absent. There was no increase of intracranial pressure.

Another patient had a glioma of the right cerebellum, and suffered from attacks of vertigo, with nausea and vomiting, symptoms which disappeared after a decompression operation.

From a study of such cases it becomes evident that vertigo of itself is of little value as a localising symptom.

Functional vertigo is of common occurrence. Oppenheim believes that anyone can bring on a feeling of giddiness by concentrating his thoughts on a loss of balance and calling up recollections of the sensation. In neurasthenic individuals fear or thought of vertigo are quite sufficient to produce it.

Vertigo is very common in traumatic neuroses, and the diagnosis of such cases is often very difficult. The vertigo of minor epilepsy must not be forgotten. It is frequently confounded with aural vertigo, although the two may coexist.

Jones advocated a more general resort to the Bárány tests in the diagnosis of vertigo. By this means one may ascertain the condition of the vestibular mechanism, and narrow down the diagnosis to three possibilities—functional, ocular, or toxæmic vertigo.

Vertigo may be due to one of the following causes:

(1) A lesion in the ear itself. The importance of labyrinthitis has only been recently recognised, but we now know that a vestibular affection produces vertigo, nausea, and vomiting, just as a cochlear affection produces deafness and tinnitus.

(2) A lesion within the brain, affecting the intracranial pathways from the ear. This may be abscess, tumour, gumma, hæmorrhage, etc.

(3) Ocular conditions may produce vertigo, which is frequently cured by correcting a refractive error.

(4) Cardio-vascular conditions causing anæmia or hyperæmia of the vestibular mechanism, affecting the ear, the pathways, or the centres.

(5) Toxæmia, which may be evanescent or permanent. The simplest illustration of the former is the vertigo produced by alcohol, while the latter include such poisons as the toxins of mumps and syphilis.

Several interesting cases of toxæmic vertigo are quoted, due respectively to pyelitis, root abscesses of teeth, and septic tonsils. In all cases a diligent search for any such foci of infection should be made.

*Douglas Guthrie.*

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## MISCELLANEOUS.

**Tooth Impacted in a Secondary Bronchus of the Left Lung; Removal by Lower Bronchoscopy after two Unsuccessful Attempts by Upper Bronchoscopy.—StClair Thomson.** "The Practitioner," vol. ci, No. 2, 1918, August, p. 61.

The aspiration of the tooth was not noticed or even suspected at the time of the accident. It occurred in a child, aged ten. According to the dentist, the tooth did not fall from his forceps in the mouth, but it fell on the napkin below the child's chin. As she was recovering from the nitrous oxide anæsthesia she threw up her arms and made a deep, wide-mouthed inspiration. It must have been at this moment that the tooth was aspirated into the left lung. The first attempt at per-oral removal failed owing to the tight impaction of a smooth, hard body.



whose slippery, conoidal surface offered no grasp for the forceps. The second effort failed because the patient collapsed before removal had been attempted. The collapse was possibly due to the traction on the heart necessitated by the obliquity of the bronchoscope tube in the per-oral route. The removal through an opening in the trachea was found to be simple, safe, and prompt, and in no way comparable to the difficulties and anxieties of the two per-oral attempts.

The following conclusions are arrived at: Endoscopy of the air- and food- passages must always remain in the hands of the expert laryngologist. If he is well experienced and in regular practice he will first approach all cases through the mouth, and in most instances he will succeed.

But in a certain number of cases, particularly the rarer and more difficult ones which occur in the left lung, the lower route, through a tracheal opening, is in the interest of the patient. It will also be the route taken more readily by those who are less experienced.

The advantages can be summarised as follows: (1) Less anxiety with the anæsthetic, as we all know that the administration through a tracheotomy opening avoids all pharyngeal and laryngeal reflexes, and is, therefore, much smoother and safer; (2) ability to succeed without several trained assistants, because there is no longer the necessity to mobilise the head; (3) the use of a wider and shorter tube, thus obtaining—(4) better illumination, (5) a larger field of vision, and (6) increased facility of manipulation; (7) less leverage and traction on the important structures at the root of the lung; (8) shorter sitting; (9) greater certainty in result; (10) in the event of failure, or of the foreign body shifting its position during the *séance*, the tracheotomy is a decided security.

Lower bronchoscopy will therefore be the necessary method in certain circumstances, or when foreign bodies are tightly impacted, or when they have receded to the deepest corners of the airway, and particularly in the greater difficulties presented by their entry into the left chest.

The only drawback is the insignificant one of a slight scar. The death-rate from a preventive tracheotomy (as compared with one done for stenosis and often executed in haste and under difficulties) should be *nil*. Two good plates illustrate the communication.

*StClair Thomson.*

### **The Internal Secretions in Ear, Nose, and Throat Affections.—Harry L. Pollock.** "Laryngoscope," May, 1917, p. 430.

Pollock holds that we shall not be able to put our treatment of glandular disturbances on a rational basis until the physiological chemists can definitely tell us by examination of the blood and the various excretions or secretions whether there is a deficiency or an over-production of the internal secretions. In perfect health all the ductless glands must work in harmony. When one or the other is working excessively or not secreting sufficiently the glands are thrown out of harmony—*i. e.* they must undertake to supply the deficiency or an antagonistic gland will secrete excessively since the inhibitory influence of the affected gland has been removed. We know that the suprarenal as well as the hypophysis acts as a check upon the thyroids and *vice versa*. When the suprarenal is destroyed or secretes too little, the hypophysis often hypertrophies and attempts to replace it in the economy.

*The Thyms.*—Basch, experimenting upon dogs, discovered that this gland continued to develop for four weeks after birth and then rapidly retrograded. (In the human subject the retrogression goes on to

puberty.) If the dog's thymus was removed previous to the fourth week, marked developmental change took place—mostly in the bony structures. The bones became soft and weak and the animals could not stand. This condition corresponds strikingly with rickets in children. Extirpation of the thymus also heightened the irritability of the nervous system. Intravenous injections of thymus extract depress the heart action, slow the pulse, and produce a fall in blood-pressure. At the *post-mortem* there is always a clot in the right ventricle. If, however, hirudin was first injected an otherwise lethal dose of thymus could be given, as this drug prevented clotting. Pollock suggests that the administration of hirudin will prevent deaths under anaesthesia in cases of status lymphaticus.

*The Suprarenals.*—The main secretion comes from the medulla of these glands from which the extract is obtained. Experimental removal of the gland produces progressive muscular weakness, cardio-vascular asthenia, and frequently pigmentation of the skin. The first effect of an injection of adrenalin is a rise of blood-pressure due to a constrictor action on the walls of the vessels themselves. This action is of short duration, and is very often succeeded by dilatation and a fall in blood-pressure. Long-continued injections cause necrosis of the middle coats of the arteries and a deposit of lime salts (arteriosclerosis).

Bossi found experimentally that in sheep, in which one gland was removed, symptoms of osteomalakia resulted in a few days. Bossi treated cases of osteomalakia with adrenalin injections, and found that the patients recovered completely. Pollock asks why, if adrenalin can cure osteomalakia, it cannot cure otosclerosis.

*The Hypophysis.*—The posterior lobe (nervous) furnishes the principal therapeutic extracts, the action of which is very similar to that of adrenalin. The hypophyseal extract, however, acts longer and can be used indefinitely. Acromegaly is caused by a hypersecretion, but not necessarily an enlargement of the gland. Hoehenegg cited the first case of acromegaly in which the hypertrophy was removed by the nasal route. There followed a diminution in size of the hands and feet with complete recovery in three months. The condition of hyposecretion was first described by Froelich and called "dystrophia adiposa genitalis."

Pollock reports a case of tumour of the hypophysis operated upon by the antro-post-ethmo-sphenoidal route: Male, aged twenty-three. Gradual onset of blindness for six months: no headaches. Nasal examination showed nasal turgescence. X rays showed flattening out of the sella and disappearance of the posterior clinoid processes. The patient was given 350 grms. of dextrose, and yet no sugar was found in the urine (increased tolerance for sugar). First operation November 12, 1916. Left middle turbinal removed and ethmoid exenterated. Second operation November 21, 1916. Anterior wall of maxillary antrum exposed through canine fossa. Posterior ethmoid broken into with curette and sphenoidal sphenoid opened. Septum between the two sphenoids broken down. Postero-superior portion of sphenoidal sinus opened with a long electric burr and hypophysis exposed. A soft tumour mass was felt, but was not removed. The patient made an uneventful recovery, but "too short a space of time has elapsed to expect any great amount of improvement in his symptoms."

J. S. Fraser.

## A NEW THEORY OF HEARING.

## REVIEW.

*A New Theory of Cochlear Mechanism: An Enquiry into the Analytical Mechanism of the Internal Ear.* By Sir THOMAS WRIGHTSON and ARTHUR KEITH. London: Macmillan & Co., Ltd., 1918. 8vo., pp. 254. Price 12s. 6d. net.

In this most interesting book Sir Thomas Wrightson and Prof. Arthur Keith give an explanation of the mechanism of hearing which differs from previous theories in several important respects.

Waves of sound travelling along the external auditory meatus are received on the drum membrane and conveyed by the chain of ossicles to the footplate of the stapes. The labyrinth is regarded as a closed cavity, whose walls are rigid except at the fenestra ovalis and the fenestra rotunda. This cavity is filled with incompressible fluid consisting of perilymph and endolymph. Any impulse imparted to this fluid is transmitted instantaneously throughout its whole mass. The scala vestibuli and scala media are, for practical purposes, one cavity, the two being separated only by the thin membrane of Reissner, which merely prevents the two fluids from mixing. Any sudden increase of pressure caused by the movement inwards of the footplate of the stapes causes a displacement of the basilar membrane towards the scala tympani and a corresponding outward movement of the membrane of the fenestra rotunda. As the stapes moves outwards again the basilar membrane rises and the fenestra rotunda recedes. This up-and-down movement of the basilar membrane takes place along its whole length simultaneously. Very little, if any, of the fluid of the scala vestibuli actually passes the helicotrema, as its impulse has already been transmitted to the scala tympani by the displacement of the basilar membrane. The up-and-down movement of the basilar membrane causes a motion from side to side of the organ of Corti, the hairs of which are embedded in the membrana tectoria. This latter structure does not move from side to side, and the result is that the hairs are bent with the varying phases of the wave, and the nerve-endings thus stimulated send periodic impulses to the brain, where they are analysed into the sensation of sound.

Wrightson commences the exposition of his theory with a dissertation on wave forms and wave motion. There are several elementary facts which it is necessary to bring before the reader.

In a simple wave the crests and hollows are equidistant and periodic. In compound waves this is no longer the case. In the study of compound wave forms Wrightson demonstrated many years ago that "although the distances apart of crests and hollows were no longer equal, yet if the crossing-points of the compound curve on the axis were regarded as impulse points as well as the maxima and minima of the crests and hollows, there were revealed to the eye numerous systems of consecutive impulses which not only satisfied the requirements of individual frequency for the simple tones, but also systems which were necessary to produce the differential and summational tones." He shows that in a simple wave there is a change of momentum at the crossing-points. In a simple sound-wave there are four distinct phases in each complete cycle, each of which produces a separate impulse on the nerve-endings of the organ of hearing.

Sound-waves of condensation and rarefaction strike the drum mem-

brane and set it in motion. The motion of the drum membrane, into which is fixed the handle of the malleus, is conveyed through the incus to the stapes. The malleus and incus together form a bent lever, the long end of which is represented by the handle of the malleus, and the short end by the long process of the incus. The hinge of this lever is roughly along a line between the anterior process of the malleus and the posterior end of the incus. The leverage has been calculated as a ratio of 3 to 1. The area of the drum membrane is about twenty times that of the footplate of the stapes, and this would give a total increase of effective pressure of  $20 \times 3$  or 60 to 1, which is transmitted by the stapes to the fluid in the labyrinth. It has been shown that the stapes has not a simple piston action, but rather that of a lever with the hinge near the posterior end of the footplate. The margin of the footplate is fixed in the fenestra ovalis by a strong annular ligament. The fibres of this annular ligament are much shorter at the posterior end than at the anterior end. This allows of only very limited movement at the posterior end, while the anterior end can move much more freely.

Connected with the chain of ossicles are two muscles—the tensor tympani and the stapedius. The tensor tympani is attached to the malleus, and its action is to pull the drum inwards. The stapedius extends forwards from the pyramid to be attached to the head of the stapes. Its action is to pull the stapes slightly out of the oval window. These two muscles then act in opposition to each other, and constitute an elastic balance which tends to bring the ossicles back into a position of rest.

The labyrinth is regarded by Wrightson as a closed box with a piston, represented by the stapes at one end and at the other end by the membrane of the round window. Any increase of pressure caused by the inward movement of the stapes is transmitted instantaneously throughout all the fluid contents of the labyrinth, and causes a simultaneous outward movement of the membrane of the round window, and *vice versa*. The cavity of the cochlea is divided into two main cavities by the bony spiral lamina and the basilar membrane. The upper passage, or scala vestibuli, contains the endolymphatic scala media, which is only separated from the perilymph by the thin Reissner's membrane.

The basilar membrane is narrowest at the commencement in the basal coil and broadest at the helicotrema end. In the basal coil it is 0.17 mm. in breadth and at the apex 0.400 mm. It is thus between two and three times as broad in the apical coil as in the basal coil. The organ of Corti is placed on the basilar membrane at its junction with the spiral lamina. It contains two sets of hair-cells, the hairs of which are embedded in the soft membrana tectoria. The hair-cells are supported by the cells of Deiters and the arch-shaped rods of Corti. One of the feet of the arch rests on the basilar membrane at its junction with the spiral lamina, the other foot rests on the basilar membrane a short distance further out. The basilar membrane is composed for the most part of strong transverse fibres which are relatively unyielding, but that part which is immediately under the arch of Corti is of a different structure from the free portion, as the fibres are here absent and the membrane is thinner and more yielding.

When the stapes moves inwards the displacement of the fluid is along the scala vestibuli in the direction of the round window at the foot of the scala tympani. Now "the relative areas of the helicotrema and the basilar membrane are respectively as 1 to 81, according to Dr. Keith's measurements, so that the liquid displacements will naturally select the



shortest route and the line of least resistance to the fenestra rotunda, thus passing by way of the basilar membrane in preference to the helicotrema, the object of which aperture seems principally to be to form a liquid continuity between the vestibular and tympanic passage, securing equality in the distribution of fluid in these two passages." "The object of the reduction of area in the vestibular and tympanic passages, apart from the spreading out of the influence of the motion to an extended line of nerves, to which I have already alluded, appears to be to reduce the mass of liquid moved."

"Between the vestibular and tympanic passages we have two flexible membranes, the basilar and the Reissnerian forming two sides of the triangular-shaped scala media (cochlear canal), the liquid endolymph filling this space. These two membranes pass the displacements from one scala to the other, though no particles of fluid pass through either of the membranes. Thus the displacements of the fenestra ovalis, Reissnerian, and basilar membranes, and the fenestra rotunda are equal, and the internal membranes move as though they form part of the liquid."

The estimated area of the basilar membrane is 13.3 sq. mm., or nine times the effective area of the footplate of the stapes. The average area of the helicotrema is 0.175 sq. mm., or one-ninth of the effective area of the stapedia footplate. The ratios of the areas are therefore as follows:

Helicotrema.	Fenestra ovalis.	Basilar membrane.
1	9	81

"It is evident that, taking into consideration the relative areas of the basilar membrane and the helicotrema, the line of motion of the displacements will follow that of least resistance or through the basilar membrane, especially in the case of such rapid displacements as we have in sound-waves." Probably little or none of the fluid displacement in the scala vestibuli passes the helicotrema. All parts of the basilar membrane rise and fall to the same extent together. In each segment of the membrane the greatest excursion takes place, not at the centre, but near the junction of the fibrillary part with the subarcuate part. The more elastic subarcuate part stretches more than the outer fibrillary part when pressure is applied to it. This movement of the basilar membrane causes a side-to-side movement of the top of the arch of Corti, and therefore of the upper surface of the organ from which project the sensory hairs. The membrana tectoria does not participate in this side-to-side movement, and hence the hairs of the organ, which are embedded in it, are subjected to a bending from side to side.

Each movement inwards of the footplate of the stapes causes a depression of the basilar membrane, a movement of the Corti arch away from the lamina spiralis and the modiolus, and a bending of the hairs towards the modiolus. When the stapes moves outwards the hairs are bent away from the lamina.

Wrightson assumes that each change of momentum of the fluid, however small, produces a stimulus. He shows how each hair-cell receives four stimuli in each complete cycle of a simple sound-wave. In the first phase, or inward movement of the stapes, the hairs are bent towards the modiolus. In the second phase the stapes is brought back to a state of equilibrium by the elastic resistance of the muscles, and the hair returns from its bent position to the upright. In the third phase the stapes moves outwards and the hair is bent away from the modiolus. In the fourth phase the hair returns to its normal upright position.

In the case of compound sound-waves every modification of the curve

produces a change of position of the hairs, and thus a series of periodic impulses are sent to the brain in exactly the order and time-relationship in which they were received. They are finally analysed in the cortex of the brain.

There are two postulates upon which Wrightson's theory essentially depends, viz., firstly, that the labyrinth is a closed box containing incompressible liquid, the only outlet for increase in pressure of which is by the round window; secondly, that in a sound-wave not only the crests and hollows, but also the points where the curve crosses the axial line, are points of stimulation.

With regard to the first point, Wrightson and Keith ignore the presence of the endolymphatic and perilymphatic aqueducts. This omission may be intentional, but one cannot consider the theory as proved until it is shown that they have no influence on the movements of the fluids in the labyrinth. It is possible that the movements of the fluids in the labyrinth are so small and of such rapidity that the presence of the two aqueducts is immaterial, but we consider that this should have been made clear in the explanation of the theory. The diameter of the aqueduct of the cochlea at its narrowest point is not so very inconsiderable in comparison with the diameter of the scala tympani that its presence should be ignored. The ductus reuniens is certainly very minute and its walls appear to be normally in apposition, but the ductus endolymphaticus, with which it communicates indirectly, is relatively wide, and has a large flattened saccular end under the dura of the posterior fossa of the skull. This sac, under the influence of increased pressure in the labyrinth, could expand into a more globular shape and allow of a displacement of endolymph relatively large in comparison with the total capacity of the labyrinth, and enormous in comparison with the capacity of the endolymph system. Again, the aqueduct of the cochlea could allow of a large displacement of perilymph from the scala tympani into the subarachnoid space, the volume of which can by no means be regarded as constant. The cranial contents are so richly supplied with large, thin-walled blood-vessels that any increase or decrease of the total volume of the fluid in the cranium is at once compensated by the contraction or dilatation of these vessels. It is common knowledge that several cubic centimetres of cerebrospinal fluid (a quantity many times the total capacity of both labyrinths) may be drawn off without causing any appreciable disturbance to the subject.

Certainly the scala vestibuli, in which the movements of the labyrinthine fluids commence, has no outlet other than the helicotrema and the movement of the basilar membrane, but to Sir Thomas Wrightson the problem of working out what, if any, influence these aqueducts have on the movements of the labyrinthine fluid should not present any great difficulty.

With regard to the second essential to the theory, namely, that there are four stimuli in every complete cycle of a simple sound-wave, Wrightson places his data and deductions so convincingly before the reader that one must accept them as correct.

Wrightson explains the gradual widening of the basilar membrane towards the apex together with the narrowing of the cochlea as a means for distributing the stapedial displacements equally over the basilar membrane.

In this theory also the idea that the hair-cells of the organ of Corti are stimulated by a movement of flexion of the hairs brings them into line with the hair-cells of the ampullæ of the semicircular canals and

otolith membranes, which we know to be stimulated by flexion of the hairs.

There are several facts which are difficult to reconcile with the displacement theory. Siebenmann's experiments showed that prolonged exposure of animals to the blast of a high-pitched whistle was followed by degeneration of the organ of Corti of the basal coil, a medium-toned whistle by degeneration in the middle coil, and a low-toned whistle of the apical coil. This appears to show that certain sounds are perceived by certain special parts of the basilar membrane. Keith, in his appendix, states—"This distributional mechanism of the cochlea will tend to confine displacements caused by vibrations of small amplitude to the basal part of the basilar membrane, while only waves of the greatest amplitude will reach the apical region." Amplitude of vibration is not the same thing as rapidity of vibration, and, in any case, the displacement theory does not allow of any selective action on any one part of the cochlea, as the whole basilar membrane would be equally affected by any one tone.

The explanation of bone-conduction is similarly unsatisfactory, and can be explained only in the case of the stapes being fixed, but not otherwise. This, however, is no great drawback to the theory, as none of the explanations of the various tuning-fork tests are really satisfactorily explained by the resonance theory either.

Whether the displacement theory as expounded by Wrightson and Keith be accepted or not, the anatomical researches of Keith render the resonance theory of Helmholtz untenable. It is impossible in an abstract such as this to go into the details of the question. Only the salient features are here given, and readers are referred to the original for further information.

Wrightson and Keith in this book have opened up new ground, and increased our knowledge of the mechanism of hearing in a way that has not been done since Helmholtz advanced his famous resonance theory many years ago. It is essential for all otologists and physiologists to study this book carefully if they wish to keep abreast of the times in their knowledge of the physiology of hearing. *J. K. Milne Dickie.*

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## NOTES AND QUERIES.

### A CASE FOR DIAGNOSIS.

Dr. Neil MacKay (Newcastle) writes:

"Can any of your readers suggest an explanation of the following case?"

"A male, aged thirty-two, with difficulty in swallowing: liquids go down pretty well, but solids hardly at all. No gullet growth, stricture, or spasm, and X-ray of chest negative.

"The epiglottis is seen to lie in close contact with the posterior wall, and the bolus appears to sit upon its lingual surface. The left cord is parietic and nearly motionless, and the right cord is weak in abduction. There is no anaesthesia or paresis of the palate, but there is some weakness in the left sterno-mastoid and trapezius. No evidence of any other nerve involvement."

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